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Issue **Article**

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REFERENCE DATA OF PRESSURE DISTRIBUTION ON THE SURFACES OF AIRFOILS HAVING THE NAMES BEGINNING WITH THE LETTER G (THE THIRD PART)

Abstract: *The results of the computer calculation of air flow around the airfoils having the names beginning with the letter G (continuation) are presented in the article. The contours of pressure distribution on the surfaces of the airfoils at the angles of attack of 0, 15 and -15 degrees in conditions of the subsonic airplane flight speed were obtained.*

Key words: *the airfoil, the angle of attack, pressure, the surface.*

Language: *English*

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Introduction

Creating reference materials that determine the most accurate pressure distribution on the airfoils surfaces is an actual task of the airplane aerodynamics.

Materials and methods

The study of air flow around the airfoils was carried out in a two-dimensional formulation by means of the computer calculation in the *Comsol Multiphysics* program. The airfoils in the cross section were taken as objects of research [1-21]. In this work, the airfoils having the names beginning with the letter *G* were adopted. Air flow around the airfoils was carried out at the angles of attack (α) of 0, 15 and -15 degrees. Flight speed of the airplane in each case was subsonic. The airplane flight in the atmosphere was carried out under normal weather conditions. The geometric characteristics of the studied airfoils are presented in the Table 1. The geometric shapes of the airfoils in the cross section are presented in the Table 2.

Table 1. The geometric characteristics of the airfoils.

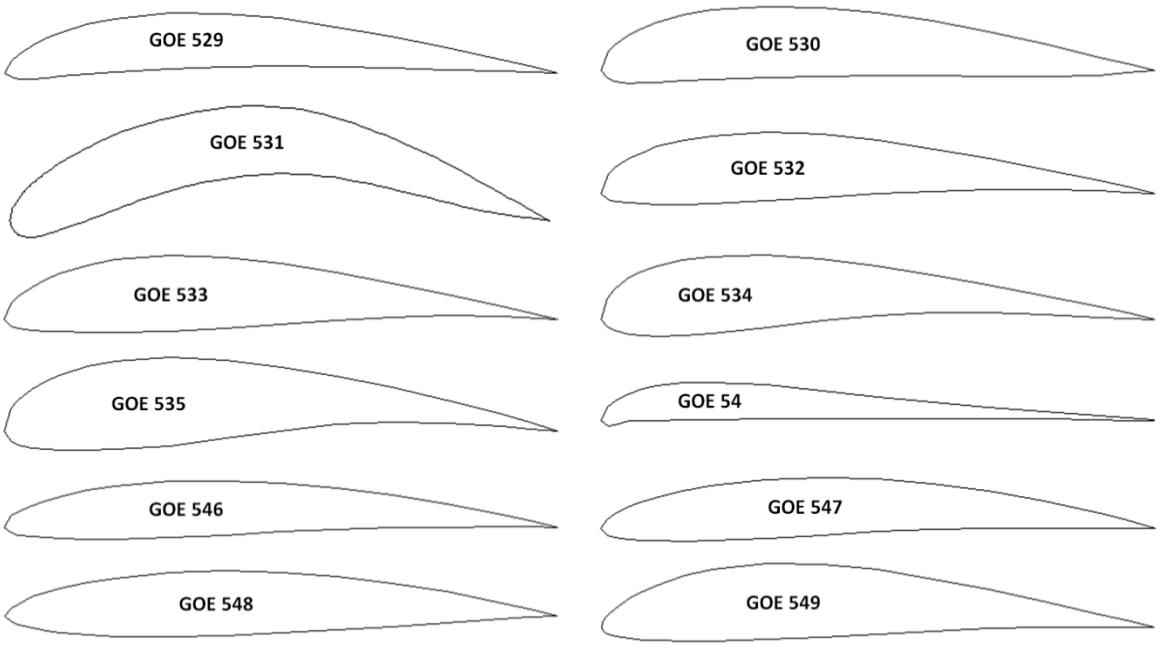
Airfoil name	Max. thickness	Max. camber	Leading edge radius	Trailing edge thickness
GOE 529	9.7% at 30.0% of the chord	5.78% at 40.0% of the chord	0.9959%	0.0%
GOE 530	12.89% at 30.0% of the chord	5.08% at 30.0% of the chord	2.3863%	0.0%
GOE 531	13.77% at 19.9% of the chord	14.68% at 49.7% of the chord	3.234%	0.0%
GOE 532	12.5% at 30.0% of the chord	4.84% at 40.0% of the chord	2.007%	0.0%
GOE 533	13.7% at 30.0% of the chord	4.68% at 40.0% of the chord	1.7598%	0.0%
GOE 534	14.1% at 20.1% of the chord	5.21% at 40.0% of the chord	2.6543%	0.0%
GOE 535	16.05% at 20.0% of the chord	5.75% at 50.0% of the chord	3.3279%	0.0%
GOE 54	6.48% at 15.0% of the chord	3.48% at 20.0% of the chord	1.2012%	0.35%
GOE 546	10.4% at 30.0% of the chord	3.57% at 50.0% of the chord	1.0971%	0.0%
GOE 547	10.5% at 30.1% of the chord	4.01% at 50.0% of the chord	1.0282%	0.0%
GOE 548	11.9% at 40.0% of the chord	2.3% at 50.0% of the chord	0.8502%	0.0%
GOE 549	13.85% at 30.0% of the chord	4.68% at 40.0% of the chord	1.0286%	0.0%
GOE 55	6.16% at 15.0% of the chord	2.04% at 20.0% of the chord	1.144%	0.75%
GOE 550	12.95% at 20.0% of the chord	4.28% at 50.0% of the chord	1.5808%	0.0%
GOE 553	13.67% at 30.1% of the chord	4.65% at 40.1% of the chord	1.7941%	0.0%
GOE 559	11.15% at 30.0% of the chord	3.42% at 30.0% of the chord	0.6332%	0.0%
GOE 561	24.94% at 30.0% of the chord	10.24% at 30.0% of the chord	4.5157%	0.0%
GOE 562	14.1% at 30.0% of the chord	6.25% at 30.0% of the chord	1.2279%	0.0%
GOE 563	8.89% at 30.1% of the chord	2.24% at 50.1% of the chord	0.9821%	0.0%
GOE 564	8.2% at 30.0% of the chord	2.67% at 40.0% of the chord	0.8999%	0.0%
GOE 565	8.4% at 30.0% of the chord	2.79% at 50.0% of the chord	0.896%	0.0%
GOE 566	8.65% at 30.0% of the chord	2.55% at 40.0% of the chord	0.9352%	0.0%
GOE 567	14.73% at 30.1% of the chord	5.25% at 50.0% of the chord	1.6871%	0.0%
GOE 57	6.28% at 20.0% of the chord	5.12% at 40.0% of the chord	0.8223%	0.17%
GOE 570	33.7% at 30.0% of the chord	9.68% at 40.0% of the chord	4.8724%	0.0%
GOE 571	24.89% at 30.1% of the chord	9.82% at 30.1% of the chord	3.7648%	0.0%
GOE 572	18.59% at 30.0% of the chord	8.32% at 30.0% of the chord	1.5409%	0.0%
GOE 573	14.1% at 30.0% of the chord	6.48% at 30.0% of the chord	1.2283%	0.0%
GOE 574	10.25% at 30.0% of the chord	4.92% at 30.0% of the chord	0.7081%	0.0%
GOE 575	13.34% at 30.1% of the chord	3.6% at 40.0% of the chord	1.9633%	0.0%
GOE 584	12.7% at 30.0% of the chord	4.95% at 40.0% of the chord	2.057%	0.0%
GOE 585	8.2% at 20.0% of the chord	3.36% at 40.0% of the chord	0.9755%	0.0%
GOE 587	5.8% at 40.0% of the chord	2.96% at 30.0% of the chord	0.5925%	0.0%
GOE 590	5.7% at 30.0% of the chord	4.01% at 30.0% of the chord	0.5821%	0.0%
GOE 591	11.2% at 30.0% of the chord	5.05% at 40.0% of the chord	1.0931%	0.0%
GOE 592	14.25% at 30.0% of the chord	7.49% at 40.0% of the chord	2.3719%	0.0%
GOE 593	11.9% at 30.0% of the chord	4.05% at 40.0% of the chord	1.347%	0.0%
GOE 595	9.55% at 30.0% of the chord	3.02% at 40.0% of the chord	0.7657%	0.0%
GOE 596	9.75% at 30.0% of the chord	4.03% at 40.0% of the chord	1.1826%	0.0%
GOE 598	6.54% at 40.1% of the chord	0.97% at 50.1% of the chord	0.7279%	0.2%
GOE 599	9.97% at 30.2% of the chord	1.52% at 60.1% of the chord	0.8791%	0.35%
GOE 5K	3.7% at 50.0% of the chord	1.53% at 50.0% of the chord	1.6315%	0.0%
GOE 600	13.08% at 30.4% of the chord	1.87% at 50.3% of the chord	1.1948%	0.5%
GOE 601	16.04% at 30.6% of the chord	2.45% at 50.5% of the chord	1.9082%	0.0%
GOE 602	9.95% at 30.0% of the chord	3.48% at 40.0% of the chord	0.8036%	0.0%
GOE 602 MOD,	9.6% at 30.0% of the chord	3.8% at 50.0% of the chord	0.7897%	0.0%
GOE 604	17.75% at 30.2% of the chord	5.35% at 30.2% of the chord	2.262%	0.0%
GOE 610 B	7.79% at 40.0% of the chord	5.3% at 40.0% of the chord	0.9705%	0.0%
GOE 610-B MOD,	7.7% at 30.0% of the chord	5.68% at 40.0% of the chord	0.7301%	0.8%
GOE 611	12.9% at 30.0% of the chord	5.81% at 40.0% of the chord	1.0989%	0.65%
GOE 612	14.98% at 30.1% of the chord	5.0% at 50.1% of the chord	2.1885%	0.0%

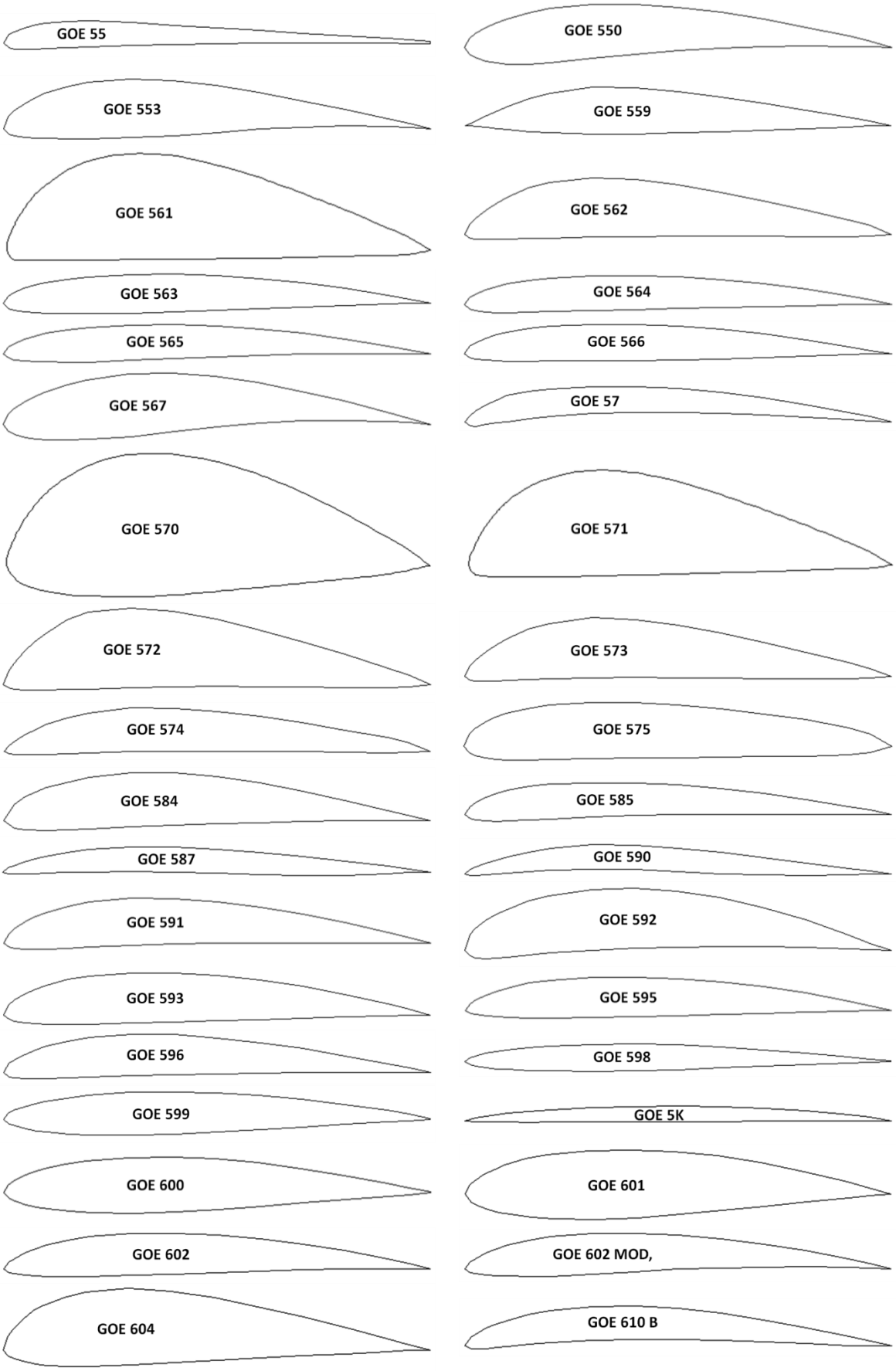
GOE 613	10.3% at 30.0% of the chord	4.1% at 40.0% of the chord	0.9794%	0.0%
GOE 614	18.69% at 30.2% of the chord	6.17% at 40.1% of the chord	2.4776%	0.0%
GOE 615	13.64% at 30.0% of the chord	5.59% at 40.0% of the chord	1.9056%	0.0%
GOE 617	13.85% at 30.0% of the chord	2.17% at 30.0% of the chord	1.5752%	0.0%
GOE 619	13.77% at 20.2% of the chord	4.53% at 50.0% of the chord	1.7645%	0.0%
GOE 620	17.5% at 30.0% of the chord	5.9% at 50.0% of the chord	2.6777%	0.0%
GOE 621	14.98% at 30.1% of the chord	5.0% at 50.1% of the chord	2.1885%	0.0%
GOE 622	8.0% at 30.0% of the chord	2.46% at 40.0% of the chord	0.7301%	0.2%
GOE 623	12.0% at 30.0% of the chord	3.9% at 40.0% of the chord	1.2372%	0.3%
GOE 624	16.0% at 30.0% of the chord	5.3% at 40.0% of the chord	2.2599%	0.5%
GOE 625	20.0% at 30.0% of the chord	6.22% at 40.0% of the chord	3.0637%	0.65%
GOE 626	16.58% at 20.4% of the chord	5.07% at 50.1% of the chord	2.5427%	0.0%
GOE 627	15.75% at 30.0% of the chord	4.07% at 30.0% of the chord	2.0355%	0.0%
GOE 628	16.72% at 20.2% of the chord	5.63% at 40.1% of the chord	2.4925%	0.0%
GOE 629	13.61% at 30.3% of the chord	2.77% at 40.2% of the chord	1.8553%	0.0%
GOE 63	8.25% at 20.0% of the chord	6.69% at 40.0% of the chord	1.6296%	0.7%
GOE 630	12.54% at 30.0% of the chord	7.66% at 40.0% of the chord	1.6226%	0.0%
GOE 632	14.0% at 30.0% of the chord	3.92% at 40.0% of the chord	1.648%	0.0%
GOE 633	13.76% at 20.1% of the chord	3.94% at 40.1% of the chord	1.999%	0.0%
GOE 645	15.47% at 20.2% of the chord	4.81% at 40.1% of the chord	1.9928%	0.0%
GOE 646	18.26% at 30.4% of the chord	4.46% at 50.2% of the chord	3.0229%	0.0%
GOE 647	16.26% at 20.1% of the chord	5.32% at 40.1% of the chord	2.2269%	0.0%
GOE 648	15.13% at 30.2% of the chord	3.9% at 40.2% of the chord	2.0529%	0.0%
GOE 650	13.42% at 20.2% of the chord	4.41% at 50.0% of the chord	1.9734%	0.0%
GOE 652	17.05% at 20.0% of the chord	9.25% at 50.0% of the chord	4.4602%	0.0%
GOE 654	14.5% at 30.0% of the chord	5.2% at 40.0% of the chord	1.6695%	0.0%
GOE 655	13.9% at 30.0% of the chord	4.39% at 40.0% of the chord	1.6224%	0.0%
GOE 670	9.0% at 30.0% of the chord	3.39% at 40.0% of the chord	1.071%	0.0%
GOE 673	10.79% at 30.1% of the chord	2.75% at 50.1% of the chord	0.6887%	0.4%
GOE 675	14.88% at 30.1% of the chord	5.87% at 40.0% of the chord	2.5819%	0.35%
GOE 676 (= M 12)	11.9% at 30.0% of the chord	2.04% at 30.0% of the chord	1.234%	0.3%
GOE 677 (= M 6)	11.95% at 30.0% of the chord	2.29% at 30.0% of the chord	1.2613%	0.4%
GOE 679	18.18% at 30.3% of the chord	4.52% at 40.3% of the chord	3.2925%	0.0%
GOE 681	16.77% at 30.3% of the chord	4.34% at 40.2% of the chord	3.0604%	0.0%
GOE 682	10.65% at 30.0% of the chord	4.33% at 40.0% of the chord	1.2466%	0.0%
GOE 683	19.9% at 30.0% of the chord	2.95% at 30.0% of the chord	2.9142%	0.0%
GOE 685	13.08% at 20.2% of the chord	4.19% at 50.0% of the chord	1.7666%	0.0%
GOE 692	16.1% at 30.0% of the chord	5.1% at 40.0% of the chord	2.267%	0.5%
GOE 693	12.0% at 30.0% of the chord	3.7% at 40.0% of the chord	1.3447%	0.5%
GOE 6K	7.5% at 50.0% of the chord	3.1% at 50.0% of the chord	1.4652%	0.0%
GOE 701	12.44% at 30.1% of the chord	4.87% at 40.0% of the chord	1.6385%	0.0%
GOE 702	16.67% at 20.2% of the chord	5.1% at 40.1% of the chord	2.8796%	0.0%
GOE 703	19.4% at 30.0% of the chord	2.3% at 30.0% of the chord	3.2413%	0.0%
GOE 704	12.94% at 30.1% of the chord	2.13% at 40.1% of the chord	1.2923%	0.55%
GOE 711	14.85% at 30.0% of the chord	6.52% at 40.0% of the chord	1.3998%	1.4%
GOE 723	11.55% at 30.1% of the chord	4.48% at 50.0% of the chord	1.5289%	0.0%
GOE 735	20.1% at 30.0% of the chord	4.38% at 30.0% of the chord	3.0629%	0.0%
GOE 738	15.44% at 30.0% of the chord	2.12% at 30.0% of the chord	2.2738%	0.0%
GOE 741	15.33% at 30.0% of the chord	4.82% at 30.0% of the chord	2.5909%	0.0%
GOE 744	14.48% at 20.0% of the chord	7.02% at 30.0% of the chord	2.6801%	0.0%
GOE 746	9.75% at 30.0% of the chord	5.04% at 30.0% of the chord	0.9139%	0.0%
GOE 758	13.85% at 30.0% of the chord	4.68% at 40.0% of the chord	1.3988%	0.0%
GOE 766	12.01% at 25.0% of the chord	1.48% at 20.0% of the chord	1.8243%	0.0%
GOE 767	12.0% at 20.0% of the chord	1.5% at 20.0% of the chord	2.2866%	0.0%
GOE 769	13.82% at 20.0% of the chord	4.79% at 30.0% of the chord	3.0482%	0.0%
GOE 770	20.99% at 30.0% of the chord	4.04% at 30.0% of the chord	3.2057%	0.26%
GOE 775	21.0% at 30.0% of the chord	0.22% at 100.0% of the chord	4.2502%	0.44%
GOE 776	25.0% at 30.0% of the chord	0.26% at 100.0% of the chord	6.0556%	0.52%
GOE 777	22.0% at 30.0% of the chord	5.96% at 30.0% of the chord	3.5259%	0.26%
GOE 780	12.0% at 50.0% of the chord	1.0% at 40.0% of the chord	0.741%	0.0%
GOE 79 (PFALZ 11)	6.17% at 15.0% of the chord	5.99% at 30.0% of the chord	1.3785%	0.56%
GOE 795	8.01% at 30.9% of the chord	2.45% at 43.5% of the chord	0.5783%	0.0%
GOE 795 smoothed	8.03% at 30.9% of the chord	2.44% at 43.5% of the chord	0.5041%	0.0%
GOE 796	12.0% at 30.0% of the chord	3.69% at 40.0% of the chord	0.893%	0.4%
GOE 797	16.0% at 30.0% of the chord	5.02% at 40.0% of the chord	2.3175%	0.8%
GOE 798	20.0% at 30.0% of the chord	6.18% at 40.0% of the chord	3.6137%	0.75%
GOE 7K	11.0% at 50.0% of the chord	4.54% at 50.0% of the chord	1.4168%	0.0%
GOE 801 (MVA 301)	9.8% at 30.0% of the chord	6.18% at 40.0% of the chord	1.4086%	0.4%
GOE 802	9.8% at 30.0% of the chord	6.18% at 40.0% of the chord	1.4086%	0.4%
GOE 802 A	9.8% at 30.0% of the chord	6.18% at 40.0% of the chord	1.4086%	0.4%

GOE 802 B	9.8% at 30.0% of the chord	6.18% at 40.0% of the chord	1.4086%	0.4%
GOE 803 (HACKLINGER)	6.3% at 15.0% of the chord	6.67% at 40.0% of the chord	1.0304%	0.3%
GOE 804 (EA 8)	6.0% at 30.0% of the chord	6.25% at 50.0% of the chord	1.2926%	0.0%
GOE 81	7.43% at 30.0% of the chord	6.3% at 30.0% of the chord	1.0949%	0.27%
GOE 8K	14.85% at 50.0% of the chord	6.13% at 50.0% of the chord	1.6286%	0.0%
GOE 92	8.77% at 30.0% of the chord	5.55% at 30.0% of the chord	0.7373%	0.16%
GOE 9K	2.45% at 50.0% of the chord	0.9% at 60.0% of the chord	1.696%	0.0%
Goldberg G 5	9.49% at 20.0% of the chord	6.88% at 30.0% of the chord	1.532%	0.0%
Goldberg Zipper	9.28% at 30.0% of the chord	6.87% at 40.0% of the chord	1.2337%	0.0%
GOLDBRG6	7.1% at 20.0% of the chord	7.85% at 30.0% of the chord	1.5161%	0.3%
GOO602	10.0% at 30.0% of the chord	2.6% at 0.0% of the chord	0.9596%	0.0%
GOO620M	10.0% at 30.0% of the chord	5.29% at 40.0% of the chord	0.8311%	0.0%
Gottingen 6K	7.5% at 50.0% of the chord	3.1% at 50.0% of the chord	-0.0061%	0.0%
Gottingen 7K	11.0% at 50.0% of the chord	4.54% at 50.0% of the chord	0.2343%	0.0%
Gottingen 8K	14.85% at 50.0% of the chord	6.13% at 50.0% of the chord	0.7591%	0.0%
Grant G10	9.75% at 15.0% of the chord	5.74% at 40.0% of the chord	1.3614%	0.0%
Grant X	13.4% at 20.0% of the chord	5.5% at 30.0% of the chord	1.5875%	0.0%
Grant X-10	9.4% at 20.0% of the chord	3.93% at 40.0% of the chord	0.9466%	0.1%
Grant X-8	11.73% at 20.0% of the chord	4.9% at 40.0% of the chord	1.2909%	0.1%
Grant X-9	10.57% at 20.0% of the chord	4.42% at 40.0% of the chord	1.7342%	0.1%
GRANTG9	10.83% at 15.0% of the chord	6.41% at 30.0% of the chord	1.619%	0.0%
GRANTX12	7.8% at 20.0% of the chord	3.3% at 35.0% of the chord	0.7345%	0.08%
GRANTX14	6.7% at 20.0% of the chord	2.81% at 35.0% of the chord	0.6415%	0.06%
GRANTX16	5.8% at 20.0% of the chord	2.44% at 35.0% of the chord	0.608%	0.06%
Griffith 30% thick symmetrical suction airfoil	30.57% at 49.3% of the chord	0.0% at 0.0% of the chord	3.3846%	0.2%
GRUMMAN K-2	10.28% at 40.8% of the chord	2.45% at 89.6% of the chord	2.9221%	0.1%
GRUMMAN K-3	17.31% at 33.4% of the chord	1.35% at 71.9% of the chord	4.8841%	0.7641%

Note:
Goldberg G 5 (C. Goldberg (USA));
Goldberg Zipper (C. Goldberg (USA));
Grant G10 (C.H. Grant (USA));
Grant X (C.H. Grant (USA));
Grant X-10 (C.H. Grant (USA));
Grant X-8 (C.H. Grant (USA));
Grant X-9 (C.H. Grant (USA));
GRUMMAN K-2 (Grumman K-2 transonic airfoil (GAC .80-.53-10.3)).

Table 2. The geometric shapes of the airfoils in the cross section.




GOE 55
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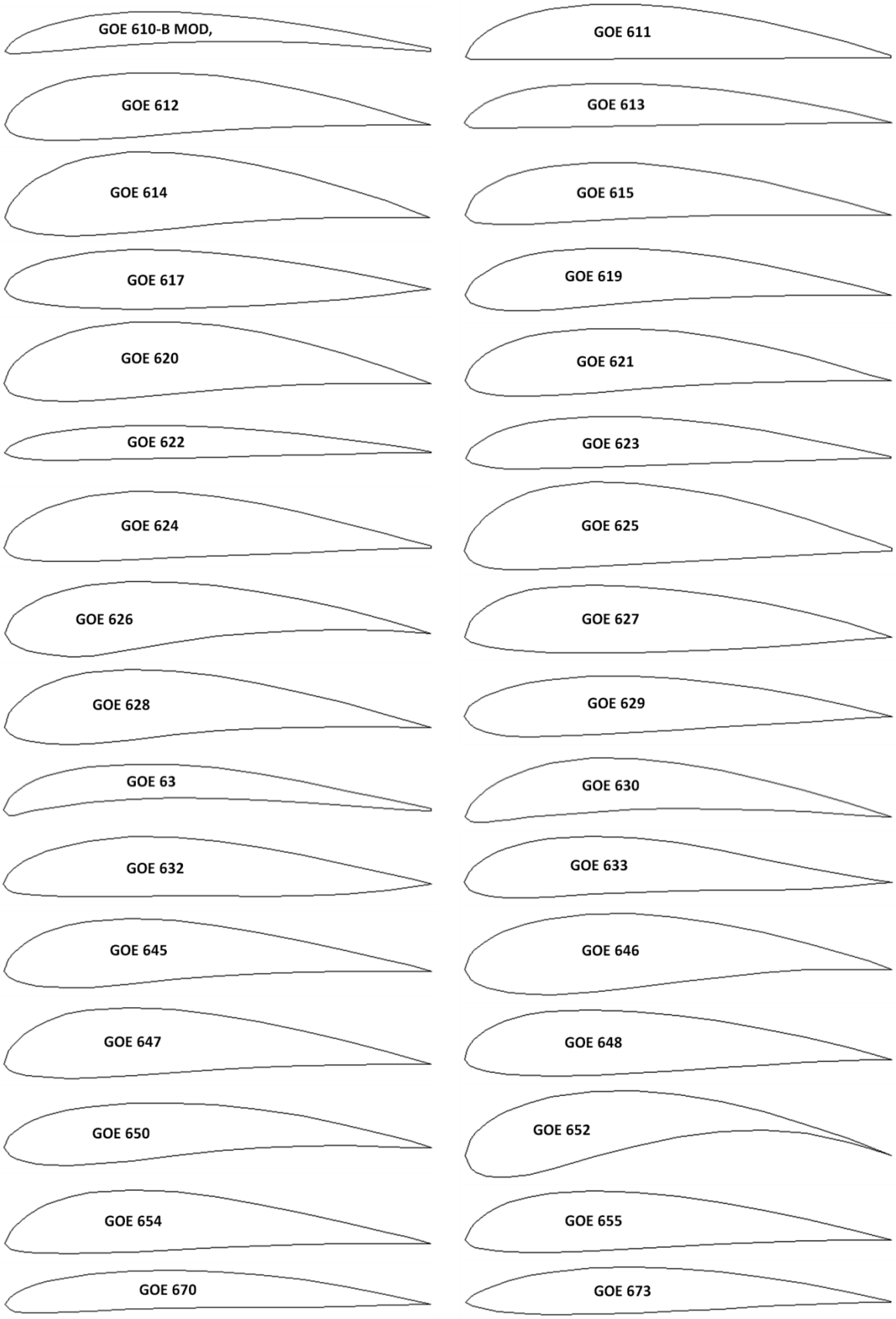
GOE 573
GOE 574
GOE 575
GOE 584
GOE 585
GOE 587
GOE 590
GOE 591
GOE 592
GOE 593
GOE 595
GOE 596
GOE 598
GOE 599
GOE 5K
GOE 600
GOE 601
GOE 602
GOE 602 MOD,
GOE 604
GOE 610 B


GOE 610-B MOD,
GOE 611
GOE 612
GOE 613
GOE 614
GOE 615
GOE 617
GOE 619
GOE 620
GOE 621
GOE 622
GOE 623
GOE 624
GOE 625
GOE 626
GOE 627
GOE 628
GOE 629
GOE 63
GOE 630
GOE 632
GOE 633
GOE 645
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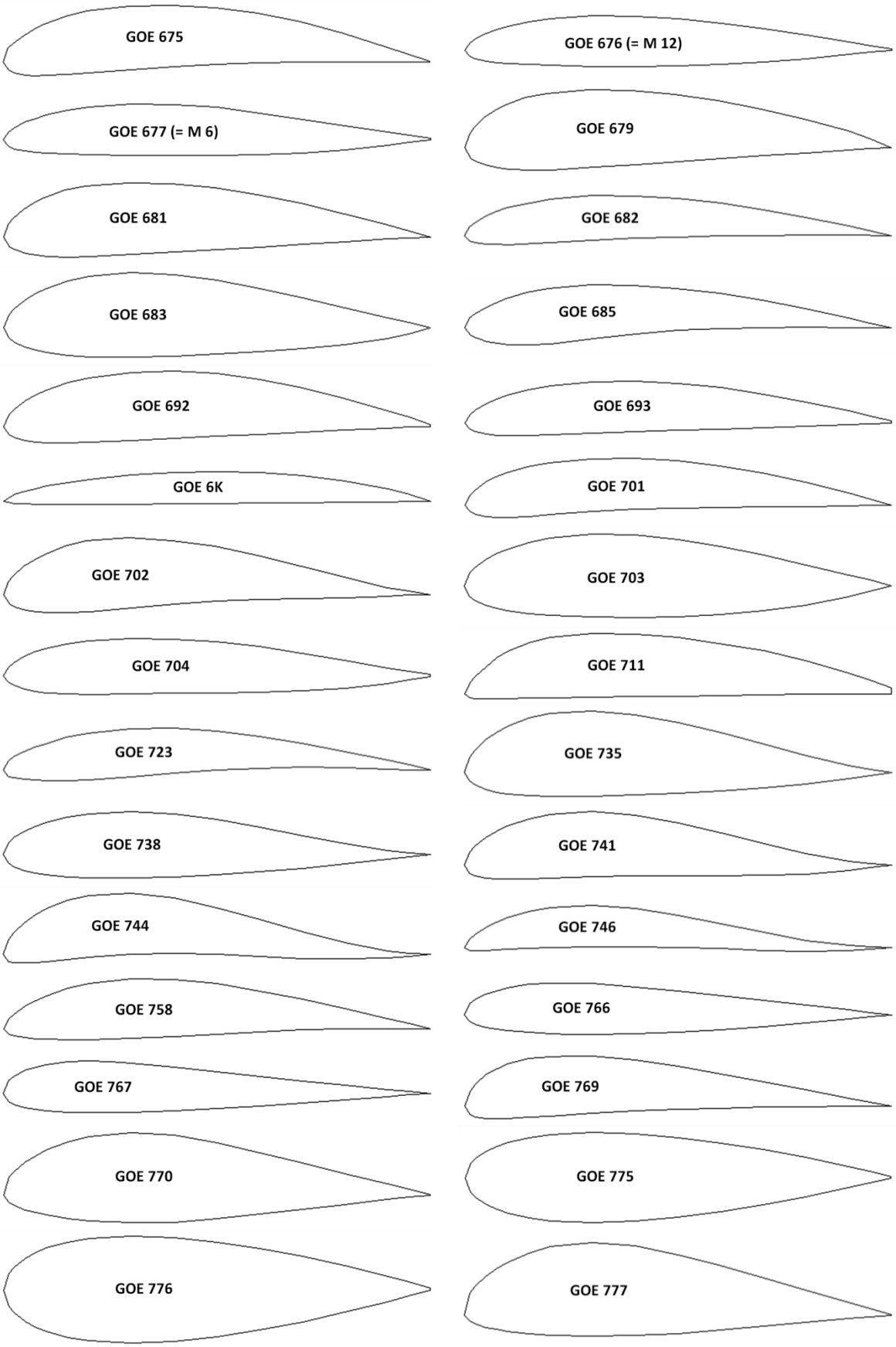
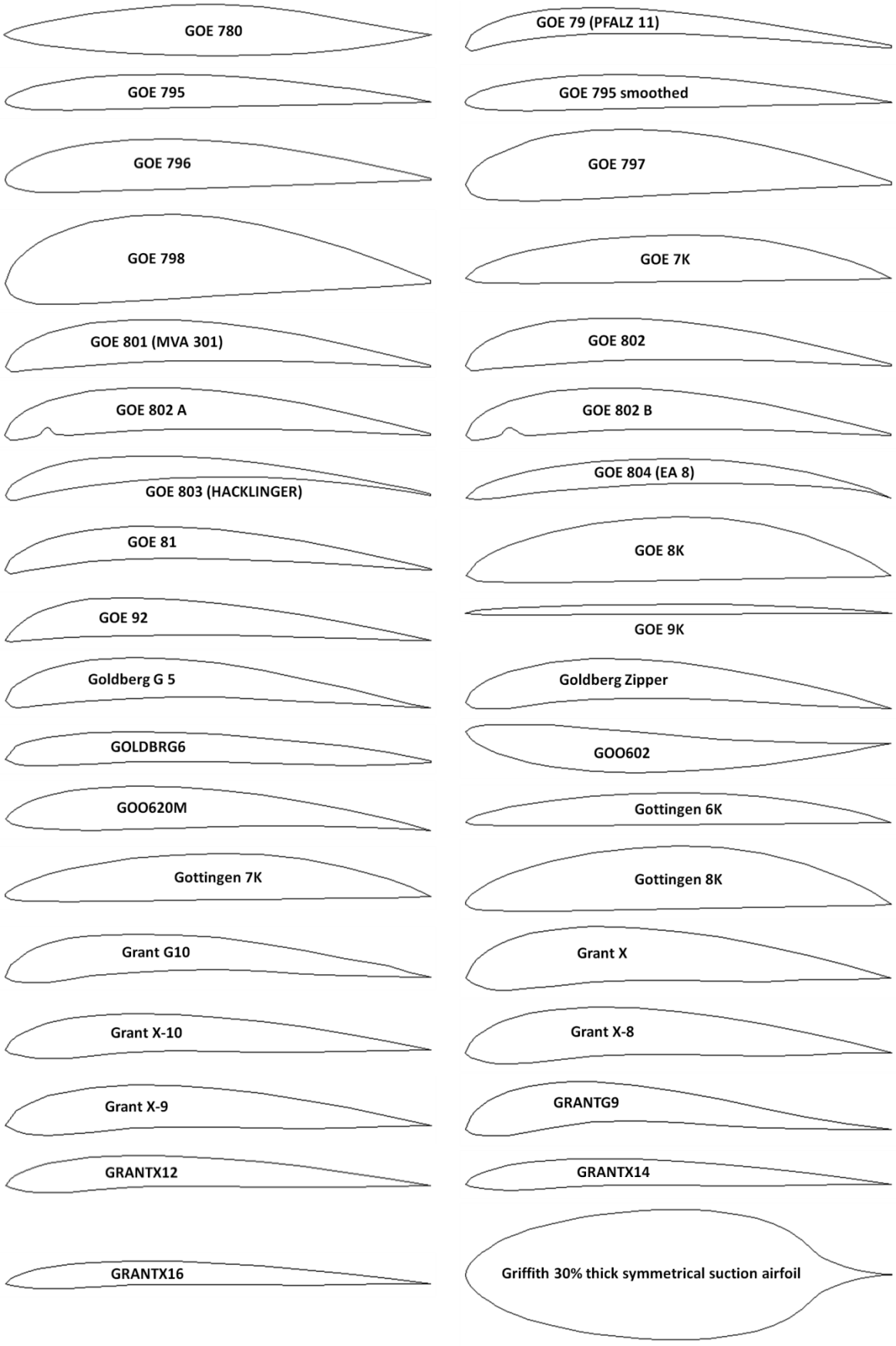
GOE 652
GOE 654
GOE 655
GOE 670
GOE 673


GOE 675
GOE 676 (= M 12)
GOE 677 (= M 6)
GOE 679
GOE 681
GOE 682
GOE 683
GOE 685
GOE 692
GOE 693
GOE 6K
GOE 701
GOE 702
GOE 703
GOE 704
GOE 711
GOE 723
GOE 735
GOE 738
GOE 741
GOE 744
GOE 746
GOE 758
GOE 766
GOE 767
GOE 769
GOE 770
GOE 775
GOE 776
GOE 777


GOE 780
GOE 79 (PFALZ 11)
GOE 795
GOE 795 smoothed
GOE 796
GOE 797
GOE 798
GOE 7K
GOE 801 (MVA 301)
GOE 802
GOE 802 A
GOE 802 B
GOE 803 (HACKLINGER)
GOE 804 (EA 8)
GOE 81
GOE 8K
GOE 92
GOE 9K
Goldberg G 5
Goldberg Zipper
GOLDBRG6
GOO602
GOO620M
Gottingen 6K
Gottingen 7K
Gottingen 8K
Grant G10
Grant X
Grant X-10
Grant X-8
Grant X-9
GRANTG9
GRANTX12
GRANTX14
GRANTX16
Griffith 30% thick symmetrical suction airfoil

Results and discussion

The calculated pressure contours on the surfaces of the airfoils at the different angles of attack are presented in the Figs. 1-148. The calculated values on the scale can be represented as the basic values when comparing the pressure drop under conditions of changing the angle of attack of the airfoils.

In this work, 148 airfoils of the GOE, Gottingen, Grant, etc. series were studied. Mostly asymmetrical airfoils in the cross section are presented, but there are also symmetrical airfoils ones (for example, GOE 598, GOE 599, GOE 776 and Griffith 30% thick symmetrical suction airfoil).

Analyzing the results of the study, it was found that during horizontal flight of the airplane with the wing profile of the Griffith 30% thick symmetrical suction, the drag is 6.92 kPa, which is the maximum value compared to the other wing profiles. The minimum drag (6.42 kPa) is observed on the leading edge of the GOE 9K airfoil. Thus, the difference in positive pressures acting on the leading edge of the considered airfoils is 0.5 kPa.

For the some airfoils (GOE 590, GOE 673, and GOE 804 (EA 8)) high negative pressure on the leading edge occurs at the angle of attack of 15 degrees. Pressure on the leading edge of the airfoils (for example, GOE 548, GOE 533 and GOE 530) does not exceed -100 kPa at the negative angles of attack. The highest drag is determined for the GOE 804 (EA 8) airfoil. The lowest drag is determined for the GOE 559 airfoil.

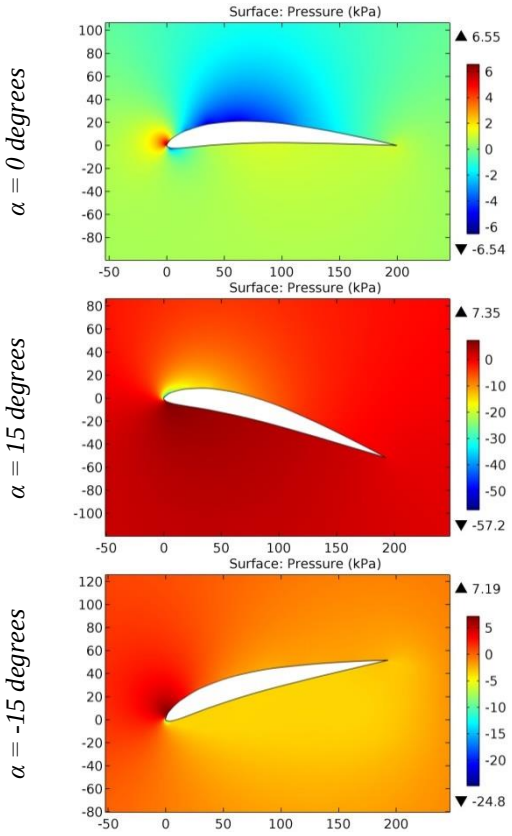


Figure 1. The pressure contours on the surfaces of the GOE 529 airfoil.

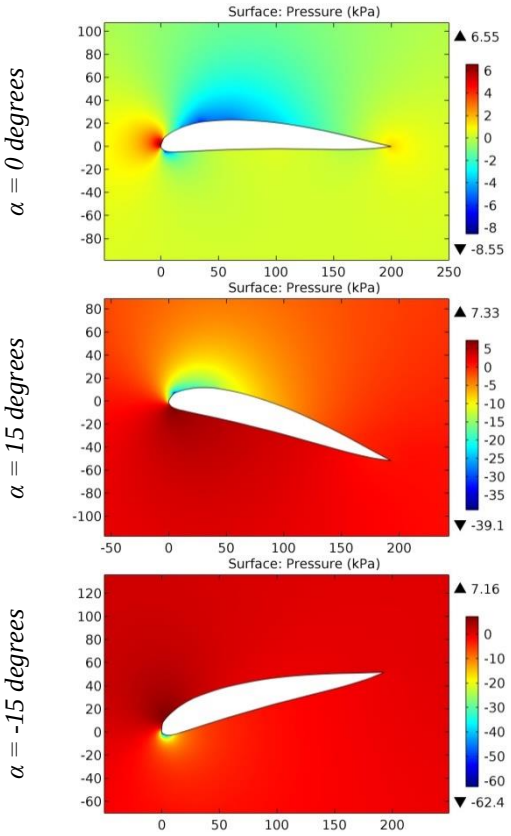


Figure 2. The pressure contours on the surfaces of the GOE 530 airfoil.

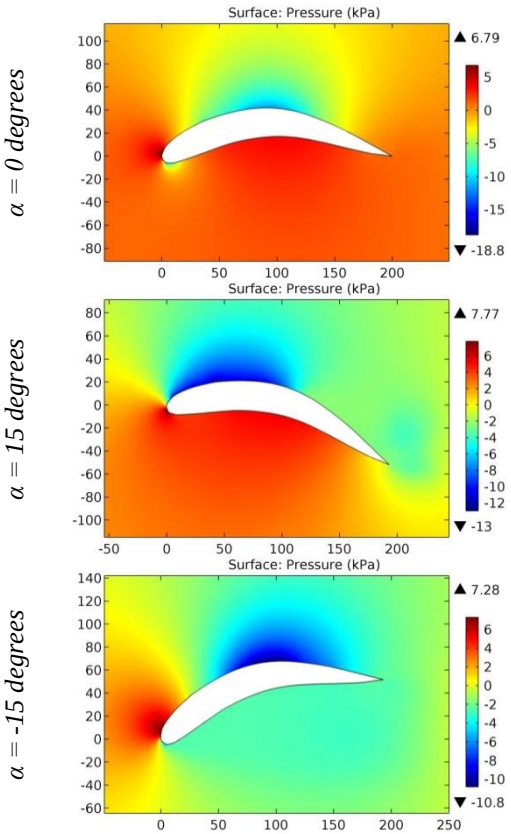


Figure 3. The pressure contours on the surfaces of the GOE 531 airfoil.

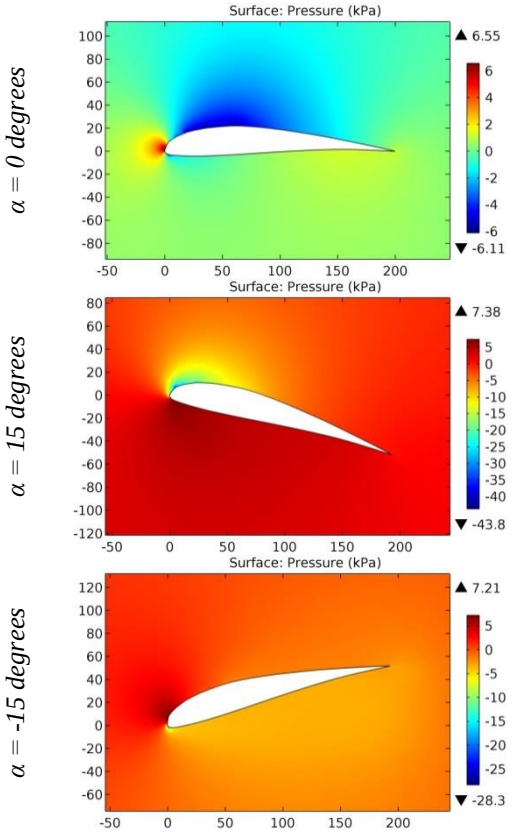


Figure 4. The pressure contours on the surfaces of the GOE 532 airfoil.

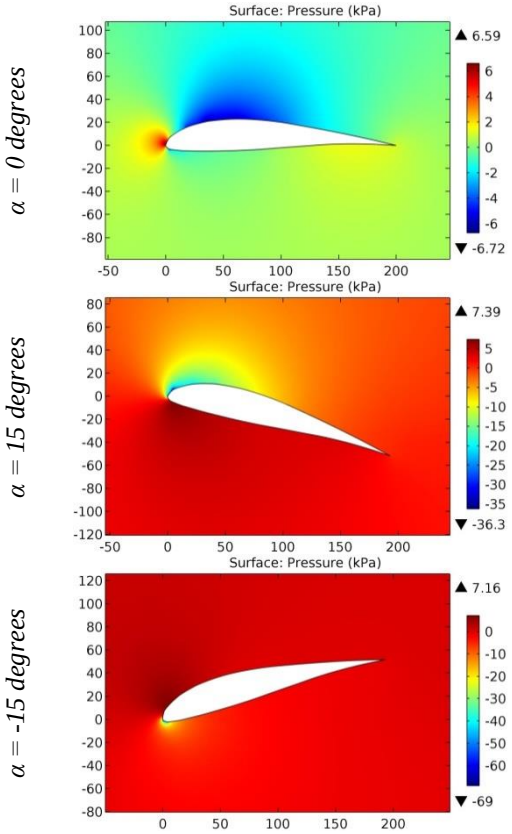


Figure 5. The pressure contours on the surfaces of the GOE 533 airfoil.

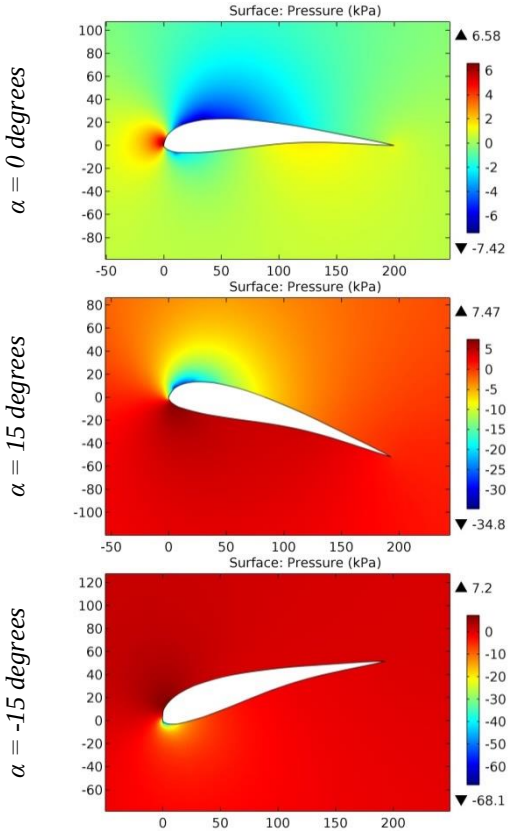


Figure 6. The pressure contours on the surfaces of the GOE 534 airfoil.

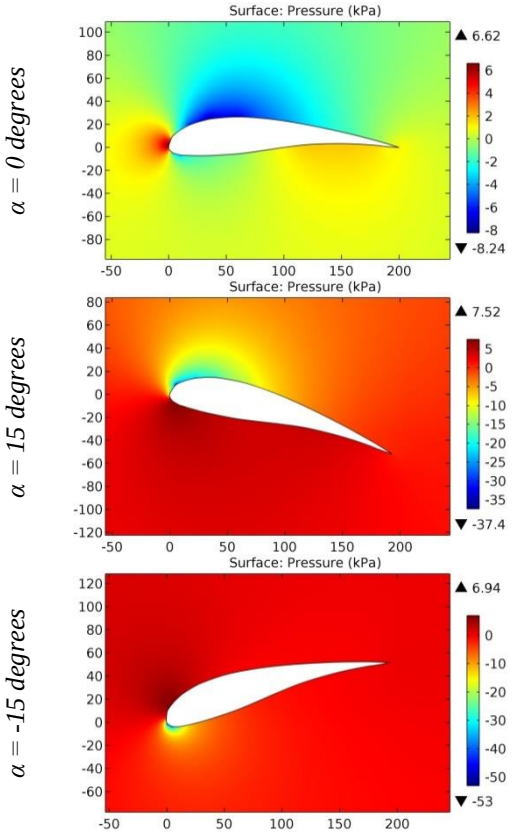


Figure 7. The pressure contours on the surfaces of the GOE 535 airfoil.

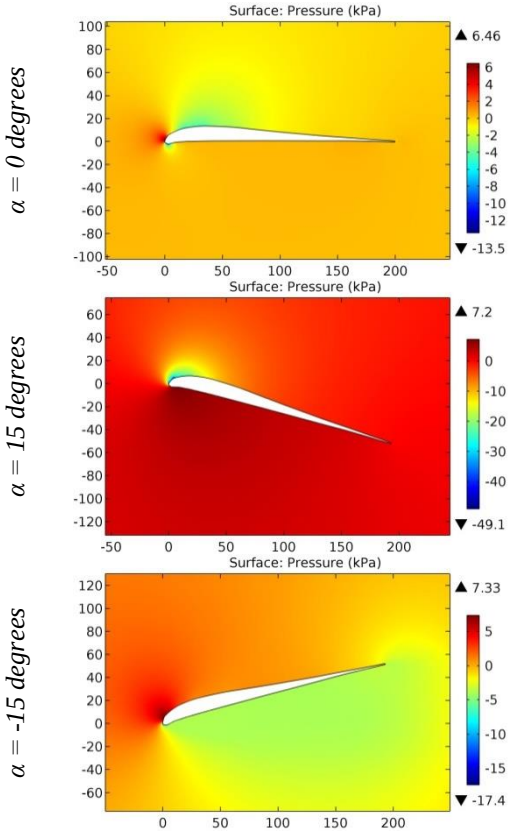


Figure 8. The pressure contours on the surfaces of the GOE 54 airfoil.

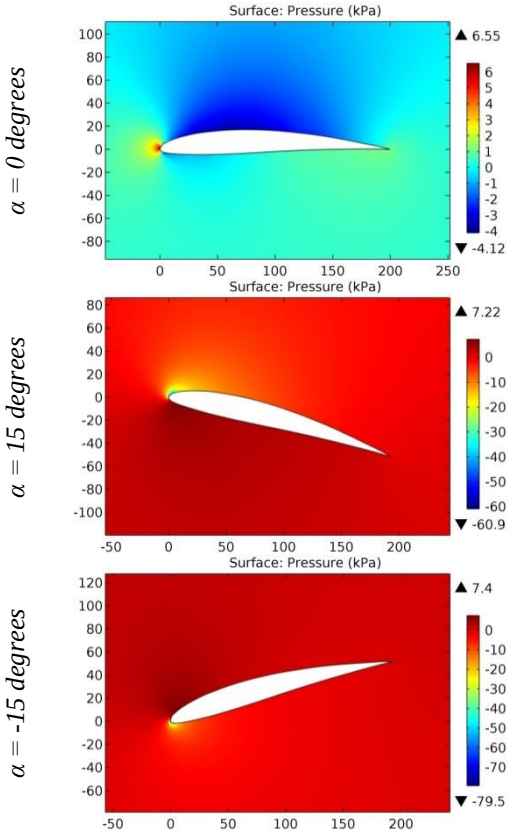


Figure 9. The pressure contours on the surfaces of the GOE 546 airfoil.

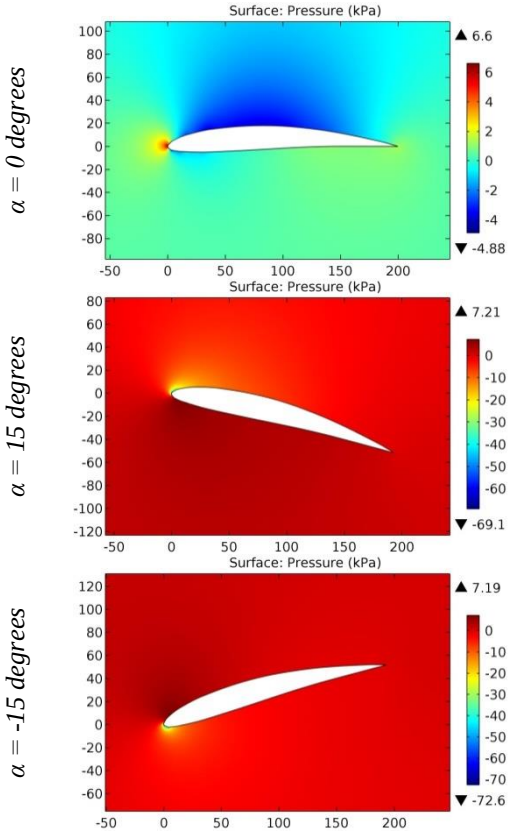


Figure 10. The pressure contours on the surfaces of the GOE 547 airfoil.

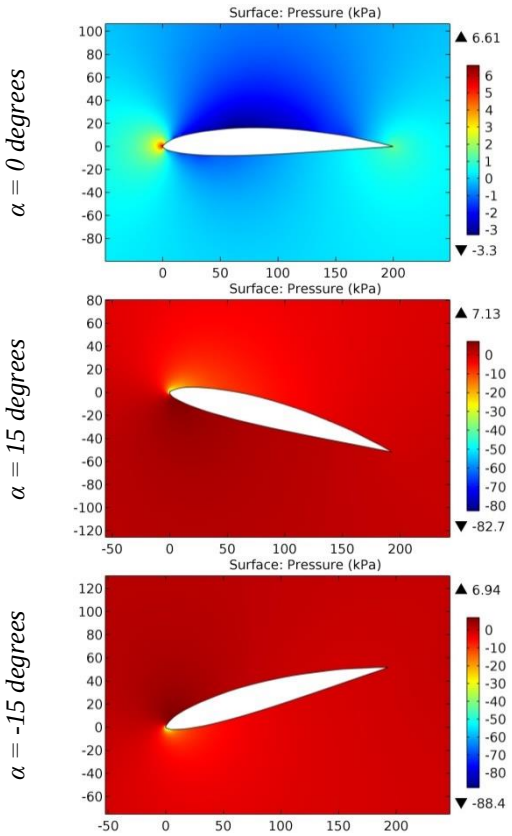


Figure 11. The pressure contours on the surfaces of the GOE 548 airfoil.

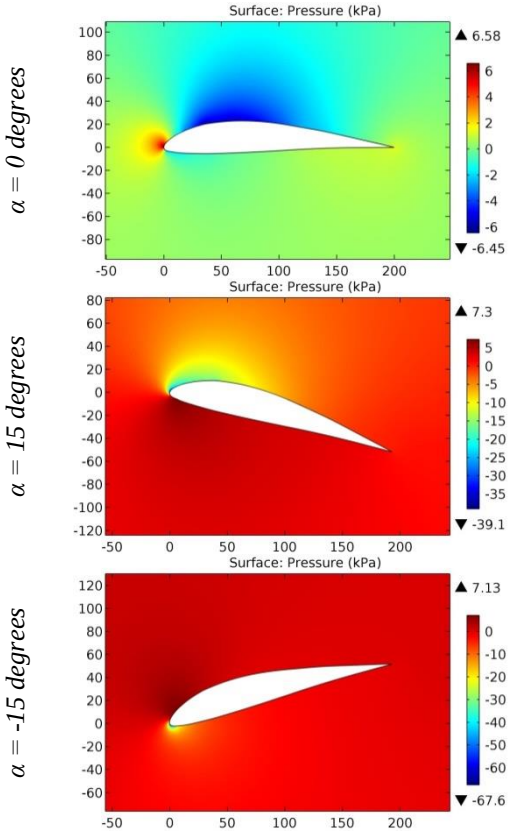


Figure 12. The pressure contours on the surfaces of the GOE 549 airfoil.

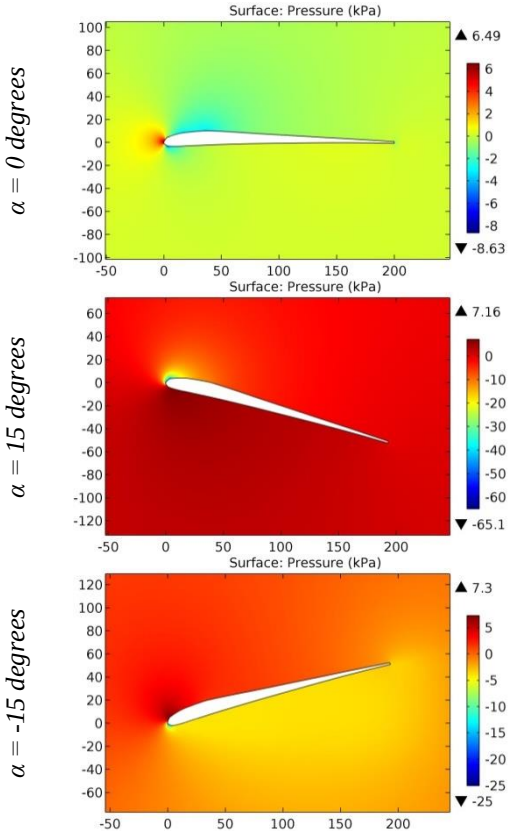


Figure 13. The pressure contours on the surfaces of the GOE 55 airfoil.

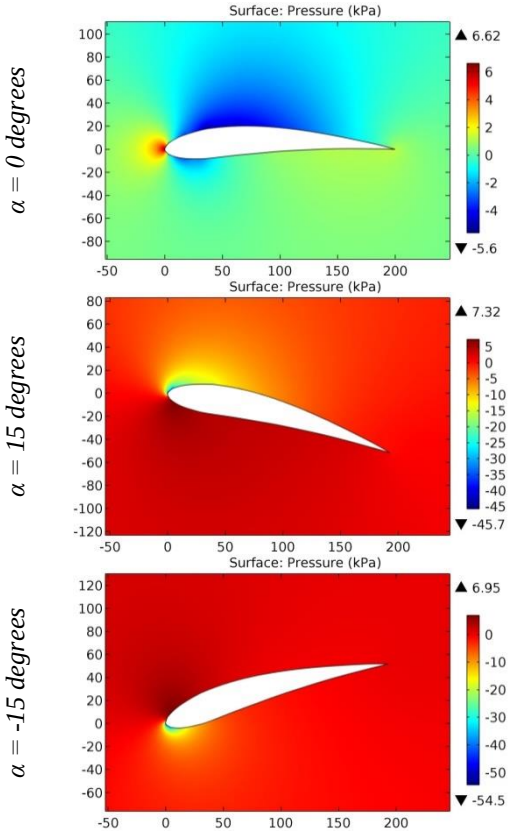


Figure 14. The pressure contours on the surfaces of the GOE 550 airfoil.

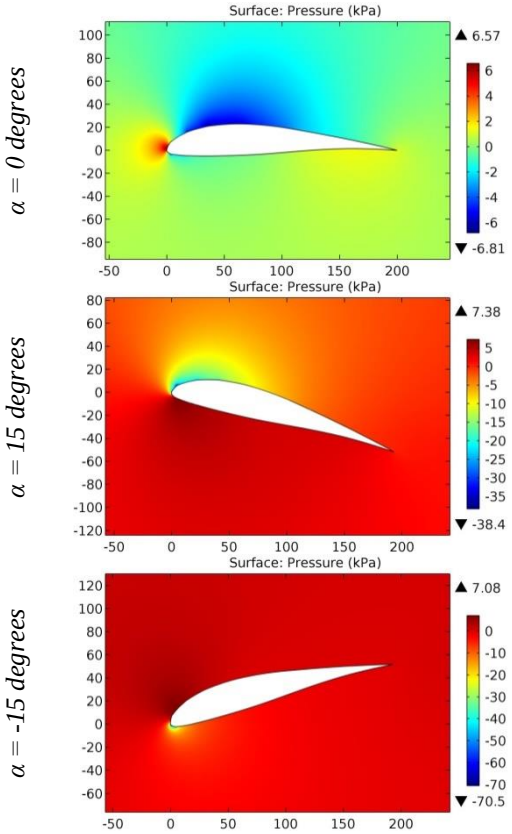


Figure 15. The pressure contours on the surfaces of the GOE 553 airfoil.

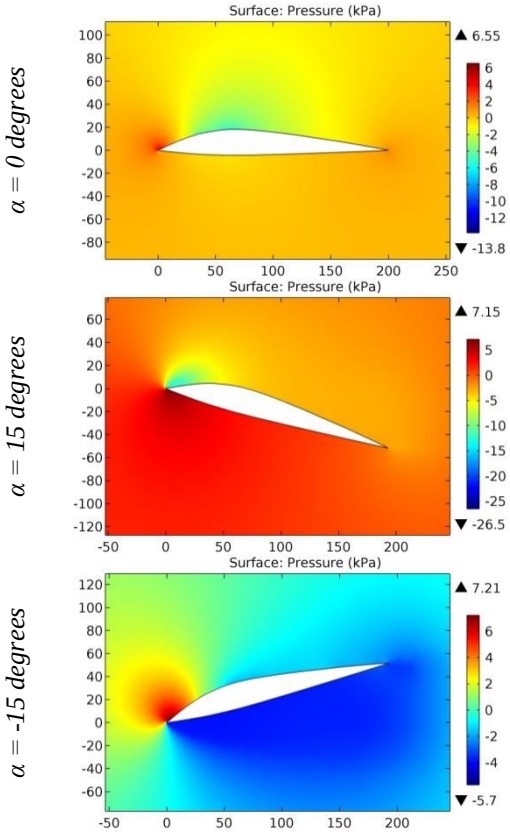


Figure 16. The pressure contours on the surfaces of the GOE 559 airfoil.

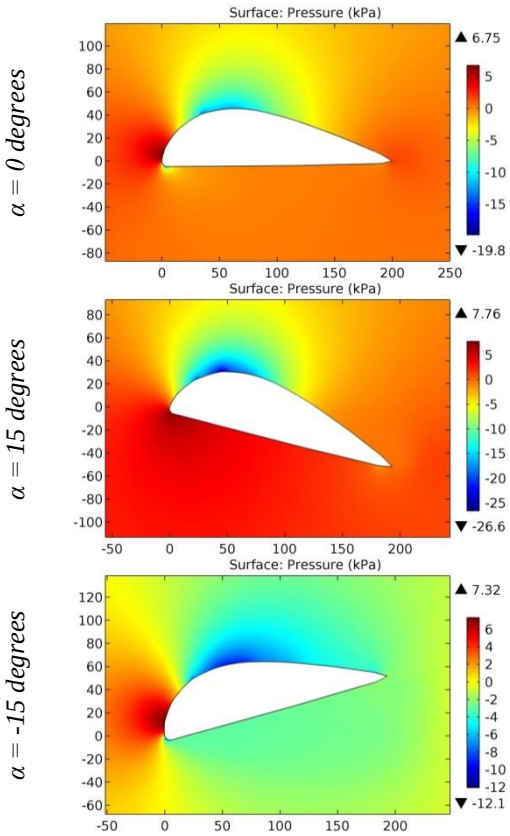


Figure 17. The pressure contours on the surfaces of the GOE 561 airfoil.

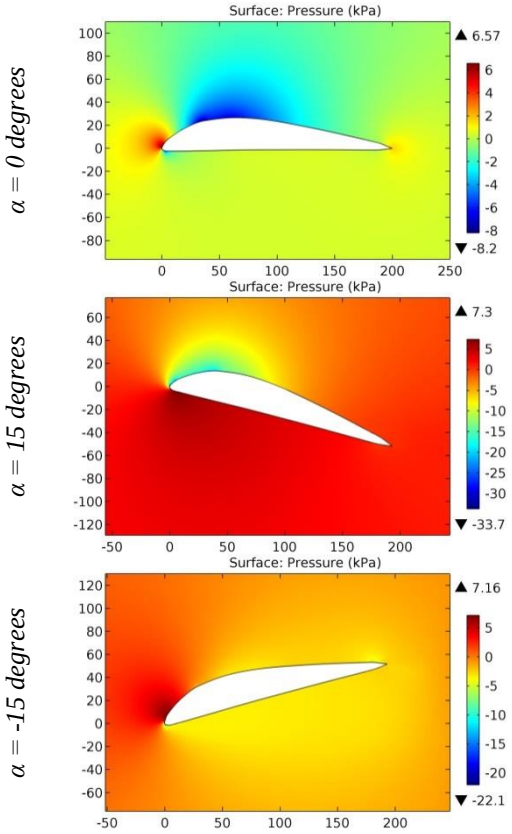


Figure 18. The pressure contours on the surfaces of the GOE 562 airfoil.

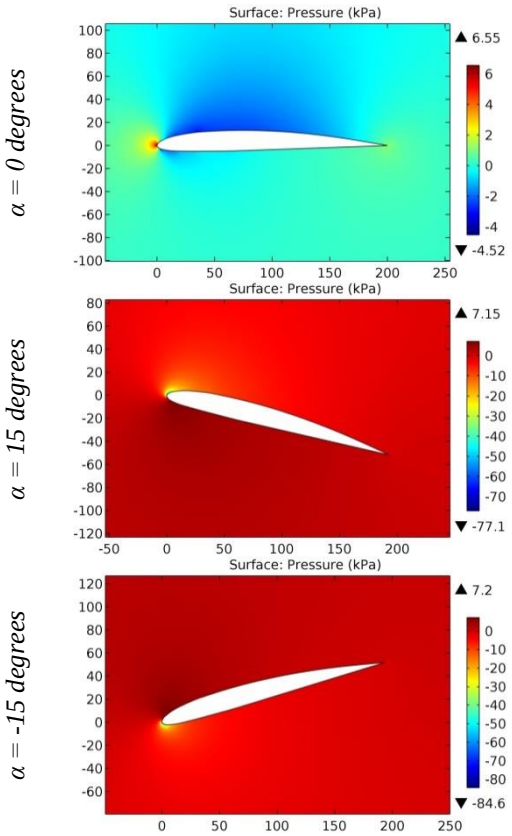


Figure 19. The pressure contours on the surfaces of the GOE 563 airfoil.

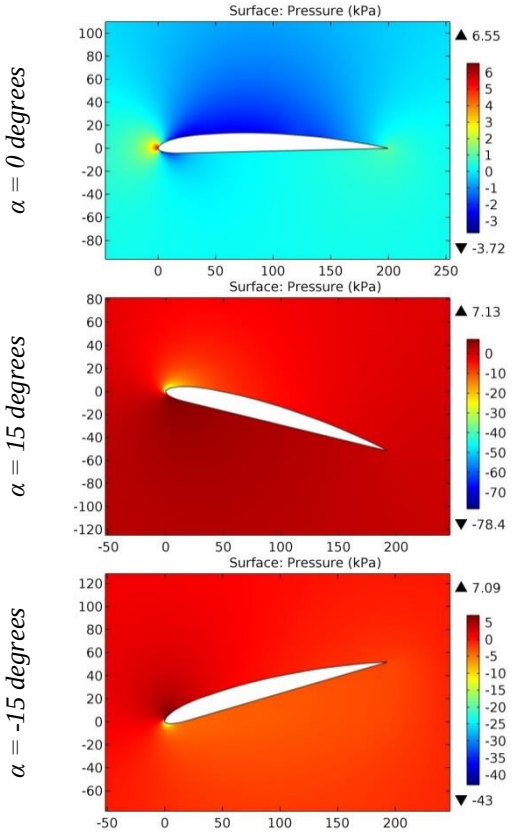


Figure 20. The pressure contours on the surfaces of the GOE 564 airfoil.

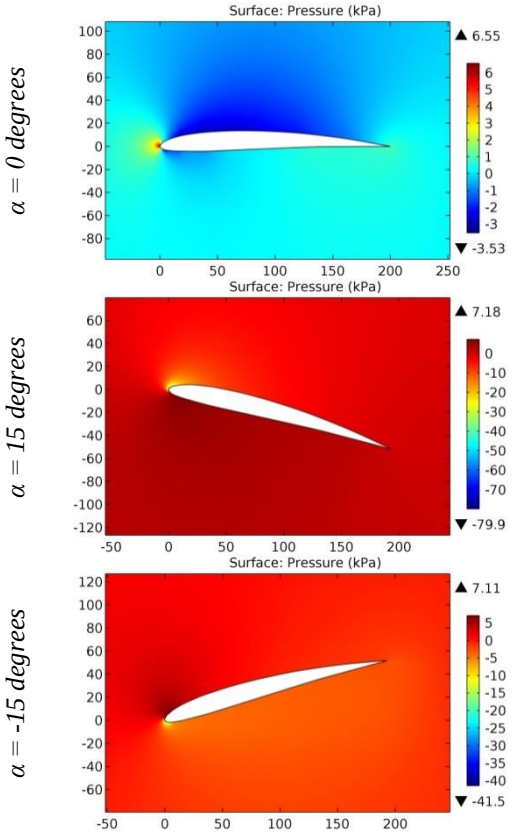


Figure 21. The pressure contours on the surfaces of the GOE 565 airfoil.

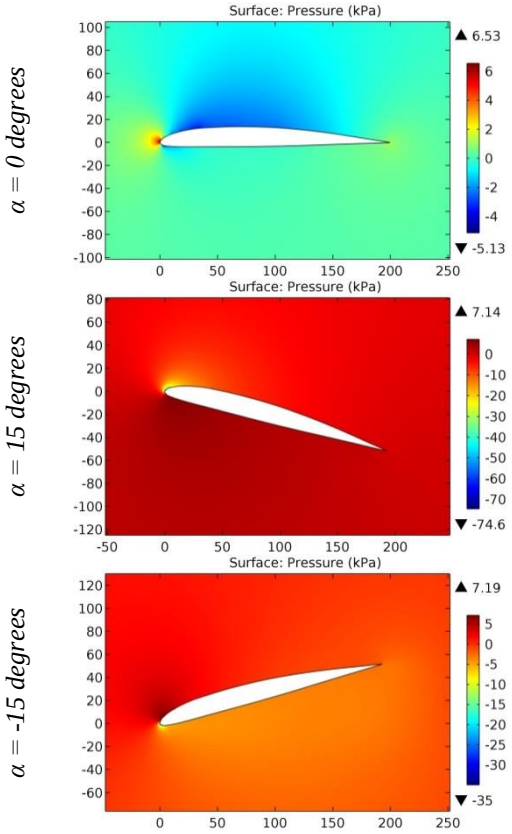


Figure 22. The pressure contours on the surfaces of the GOE 566 airfoil.

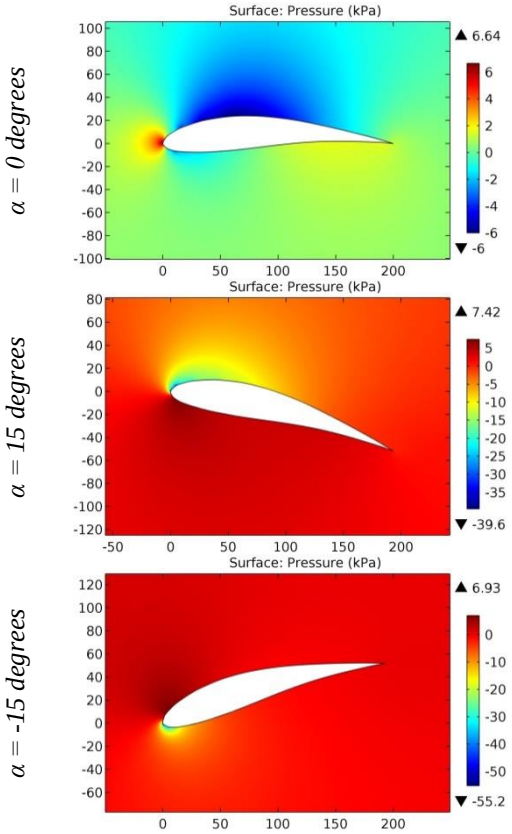


Figure 23. The pressure contours on the surfaces of the GOE 567 airfoil.

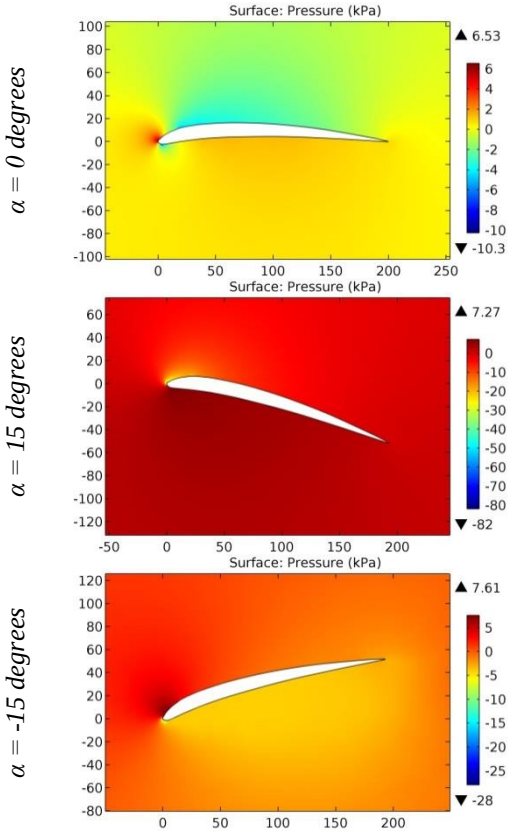


Figure 24. The pressure contours on the surfaces of the GOE 57 airfoil.

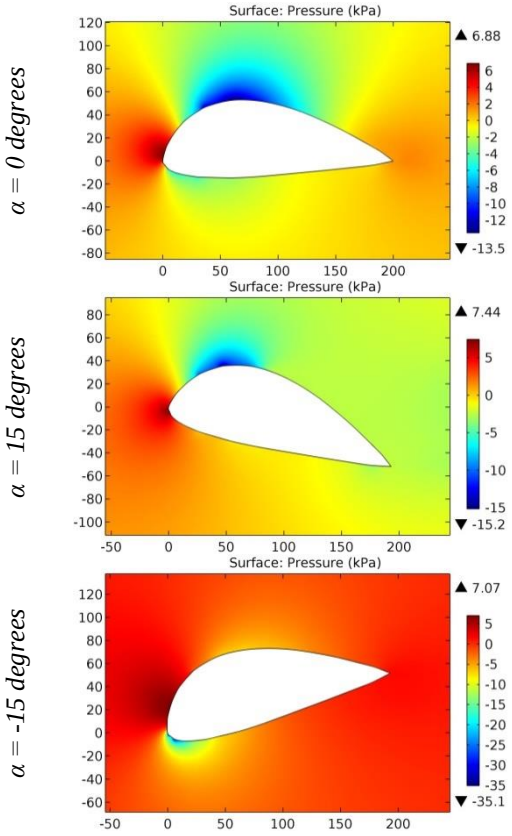


Figure 25. The pressure contours on the surfaces of the GOE 570 airfoil.

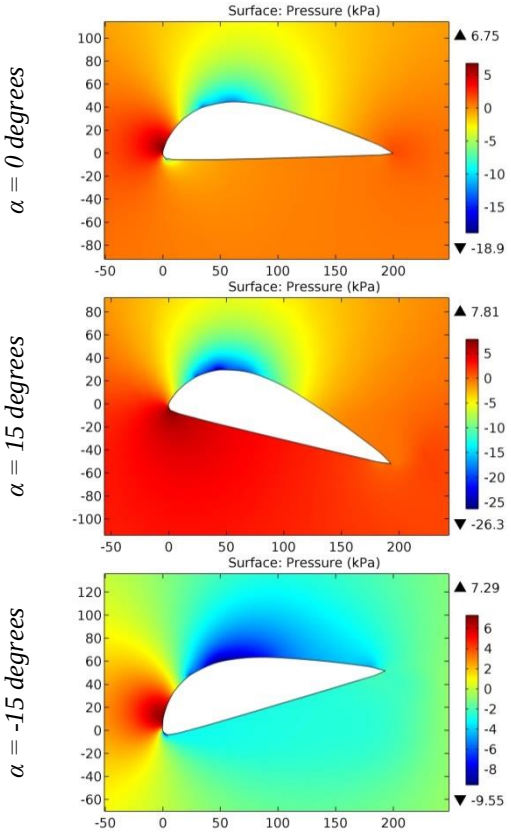


Figure 26. The pressure contours on the surfaces of the GOE 571 airfoil.

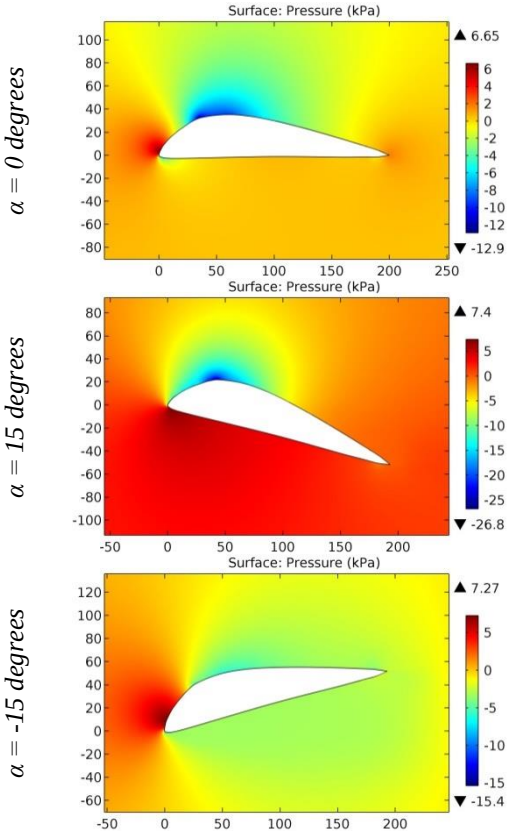


Figure 27. The pressure contours on the surfaces of the GOE 572 airfoil.

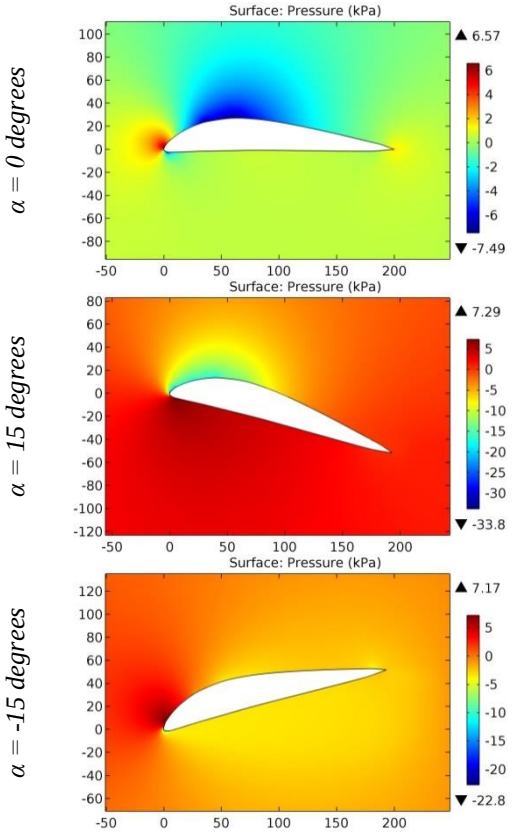


Figure 28. The pressure contours on the surfaces of the GOE 573 airfoil.

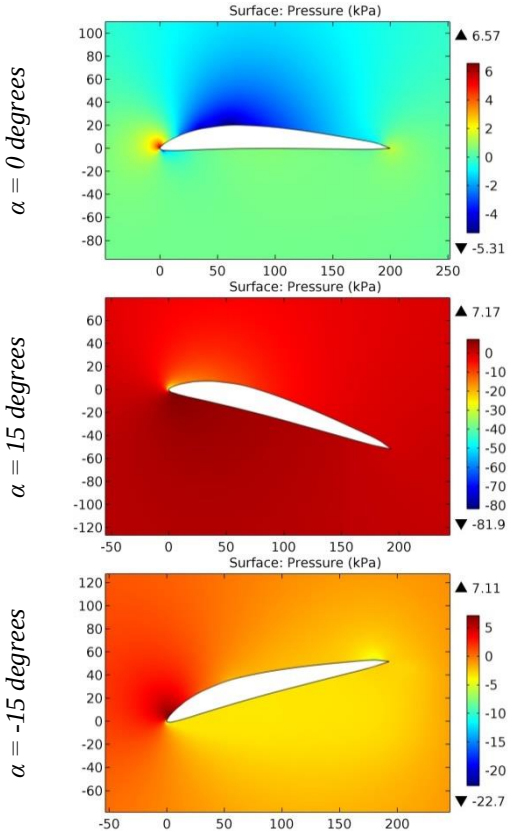


Figure 29. The pressure contours on the surfaces of the GOE 574 airfoil.

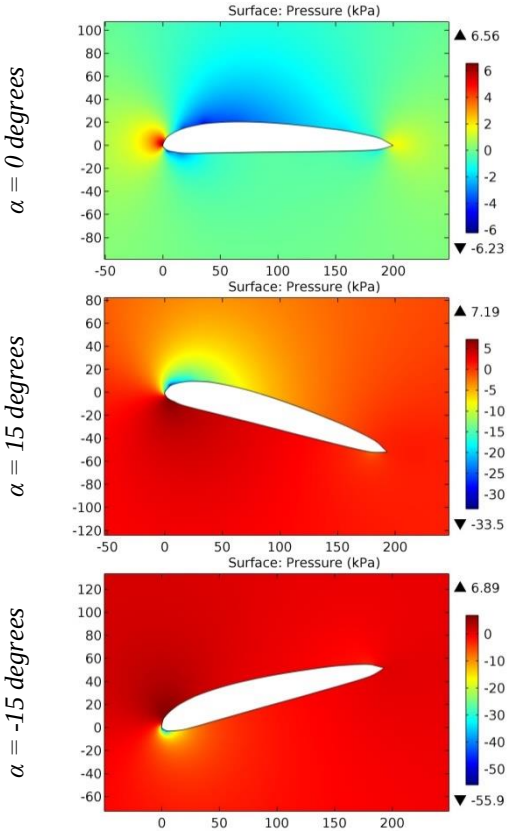


Figure 30. The pressure contours on the surfaces of the GOE 575 airfoil.

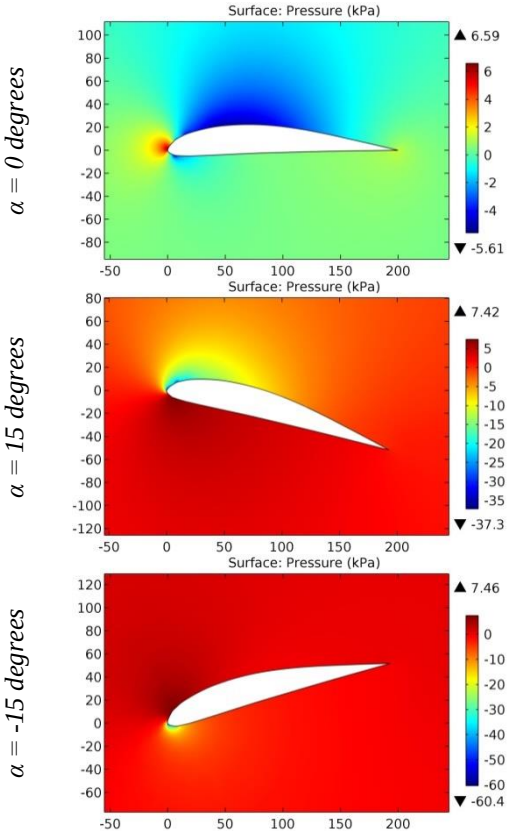


Figure 31. The pressure contours on the surfaces of the GOE 584 airfoil.

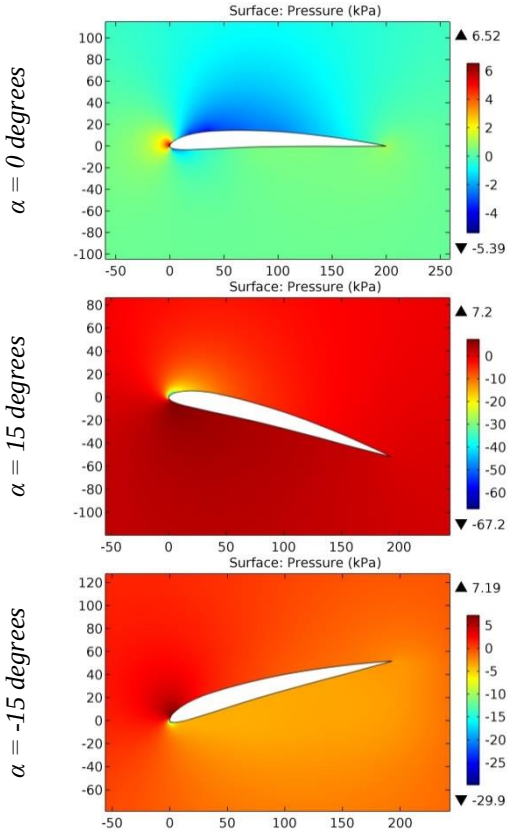


Figure 32. The pressure contours on the surfaces of the GOE 585 airfoil.

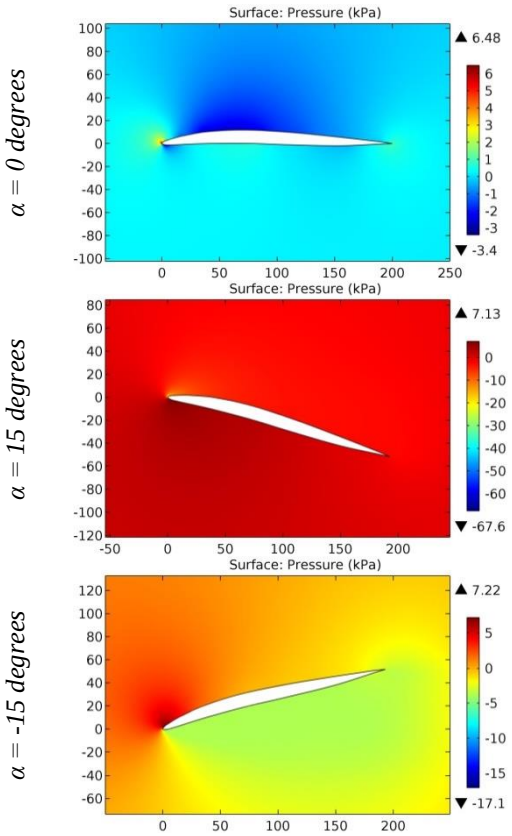


Figure 33. The pressure contours on the surfaces of the GOE 587 airfoil.

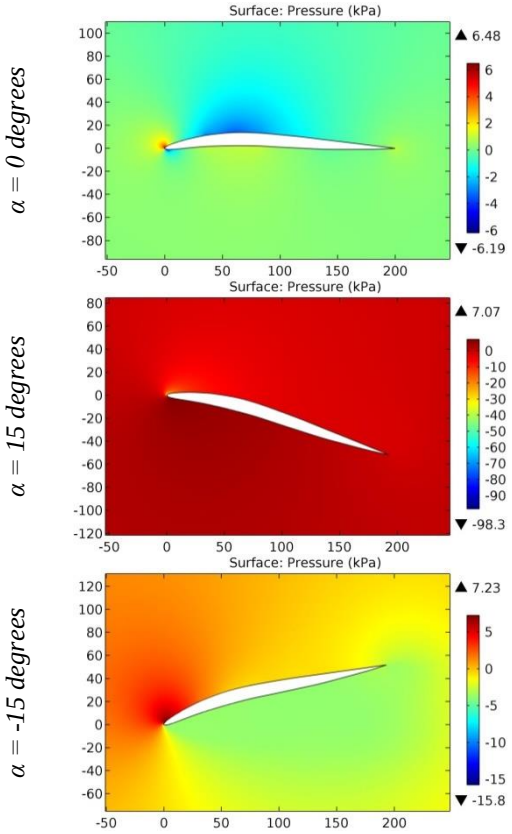


Figure 34. The pressure contours on the surfaces of the GOE 590 airfoil.

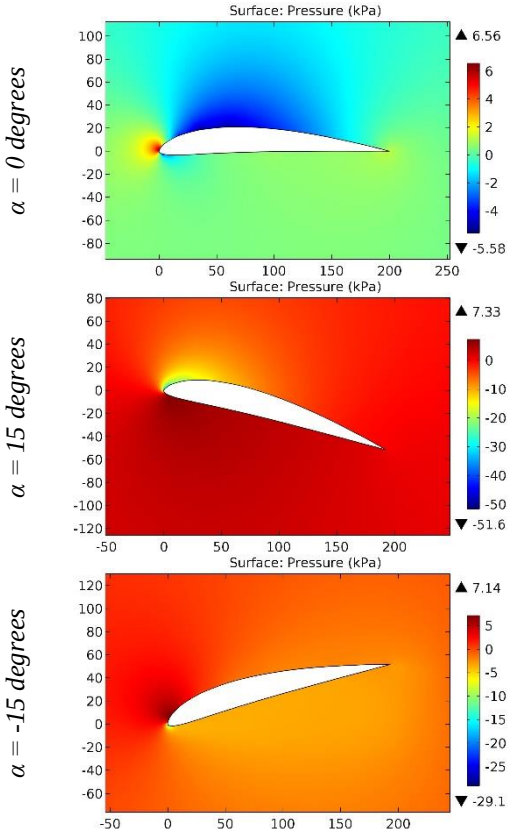


Figure 35. The pressure contours on the surfaces of the GOE 591 airfoil.

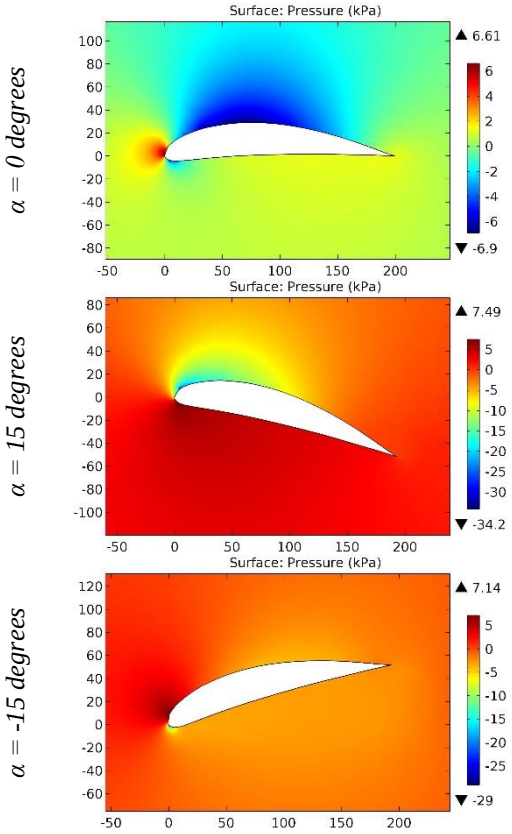


Figure 36. The pressure contours on the surfaces of the GOE 592 airfoil.

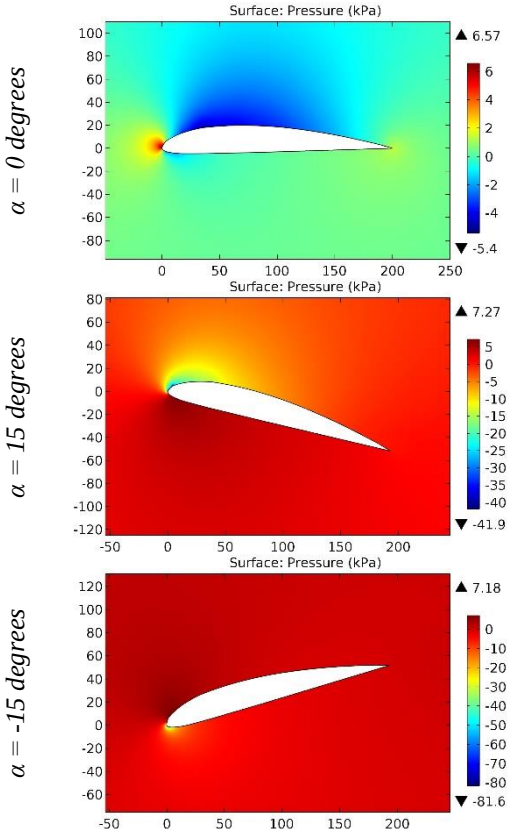


Figure 37. The pressure contours on the surfaces of the GOE 593 airfoil.

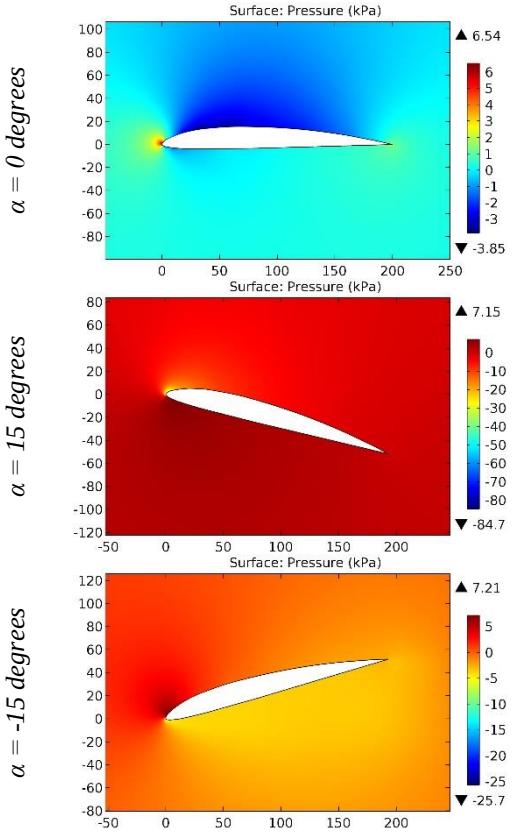


Figure 38. The pressure contours on the surfaces of the GOE 595 airfoil.

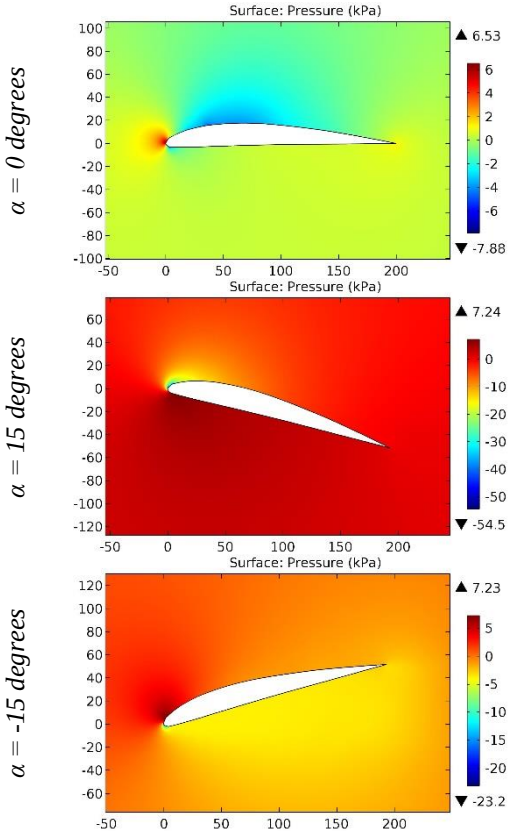


Figure 39. The pressure contours on the surfaces of the GOE 596 airfoil.

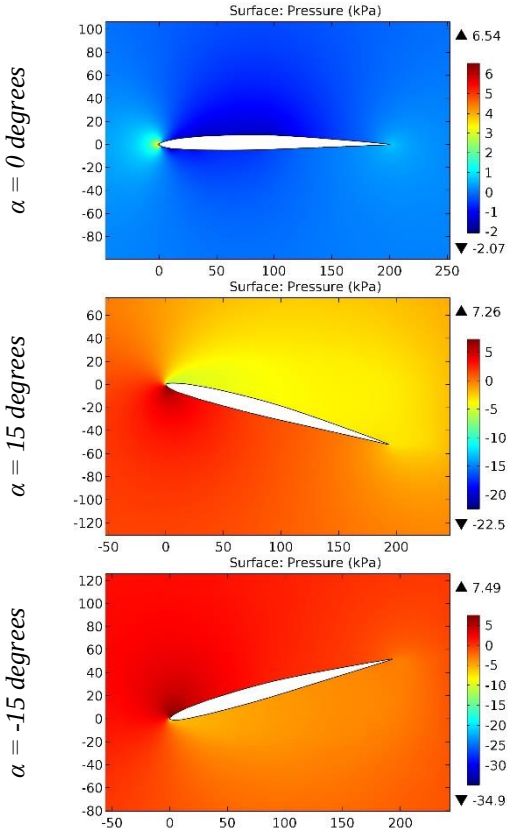


Figure 40. The pressure contours on the surfaces of the GOE 598 airfoil.

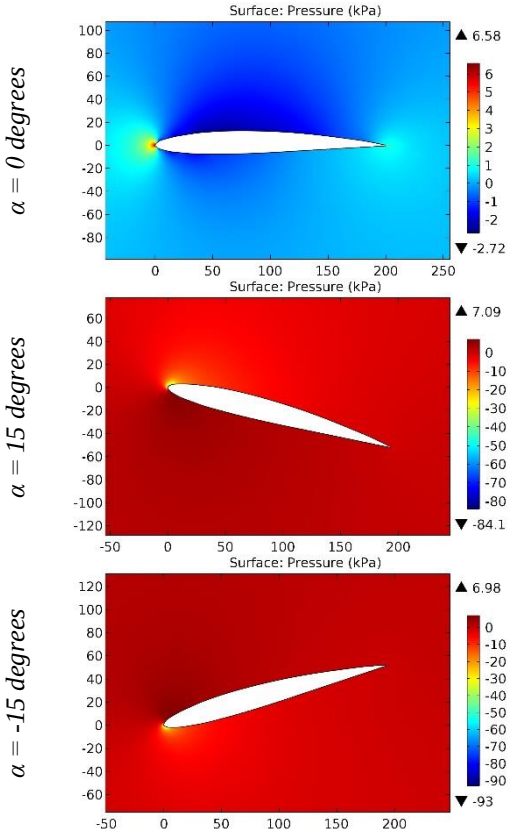


Figure 41. The pressure contours on the surfaces of the GOE 599 airfoil.

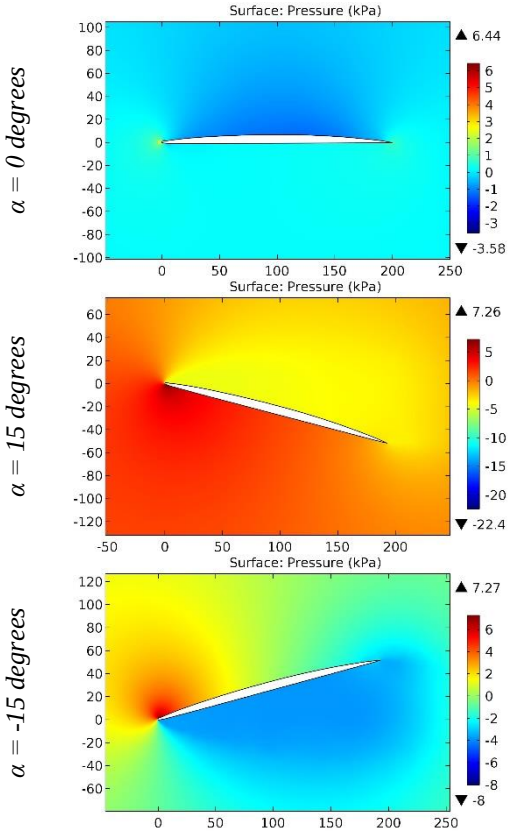


Figure 42. The pressure contours on the surfaces of the GOE 5K airfoil.

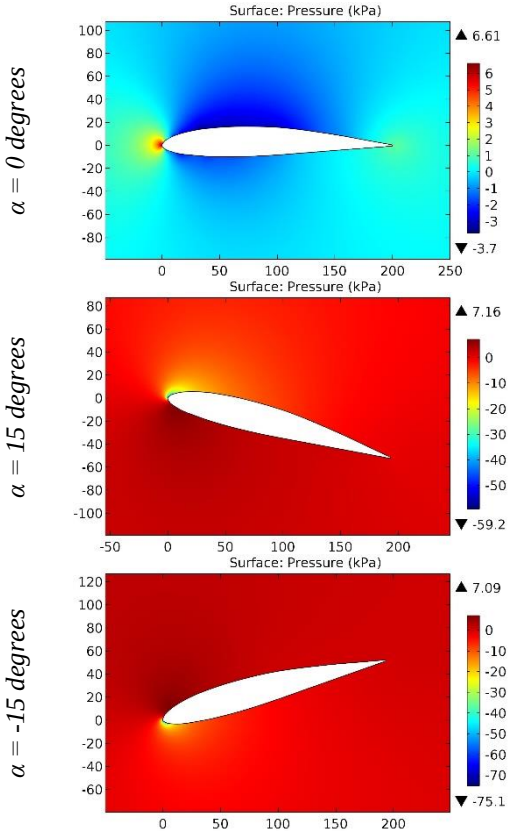


Figure 43. The pressure contours on the surfaces of the GOE 600 airfoil.

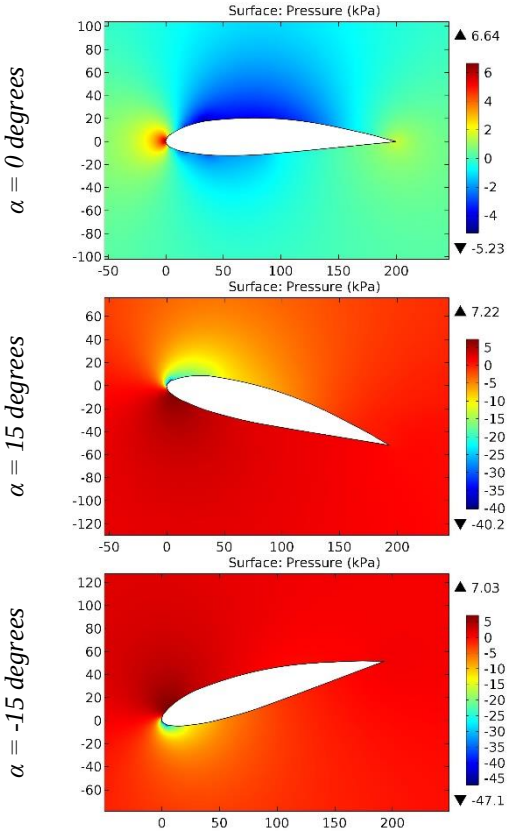


Figure 44. The pressure contours on the surfaces of the GOE 601 airfoil.

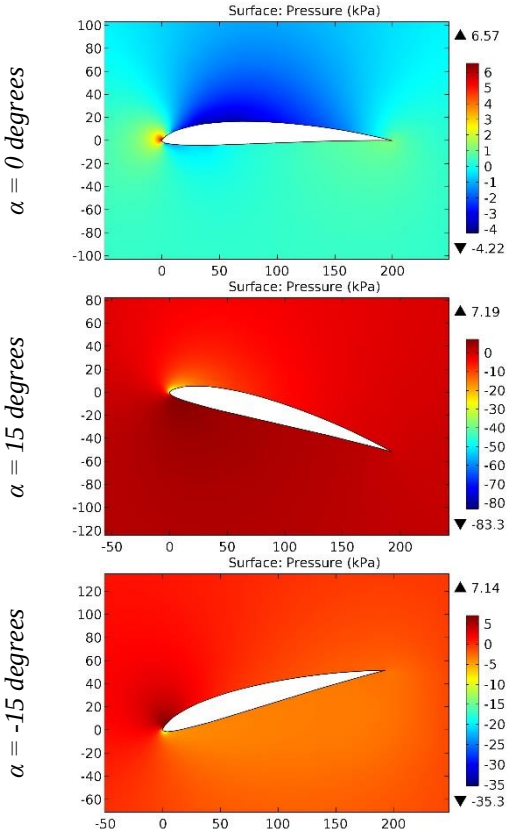


Figure 45. The pressure contours on the surfaces of the GOE 602 airfoil.

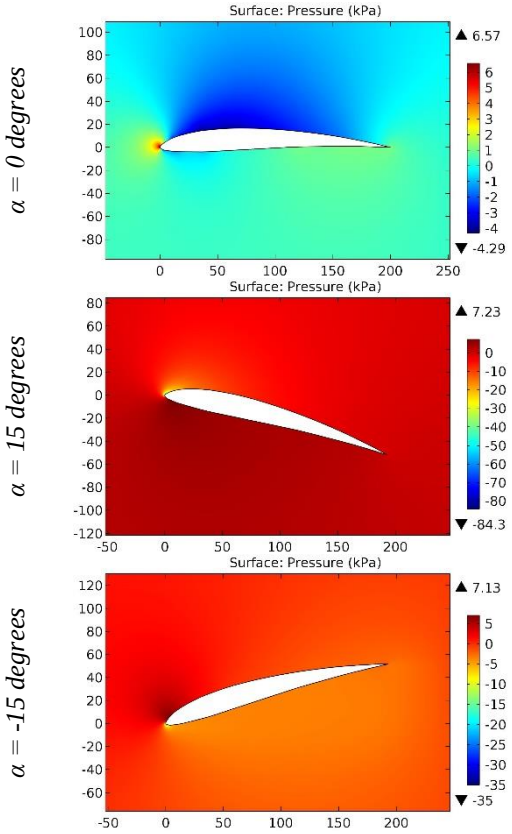


Figure 46. The pressure contours on the surfaces of the GOE 602 MOD, airfoil.

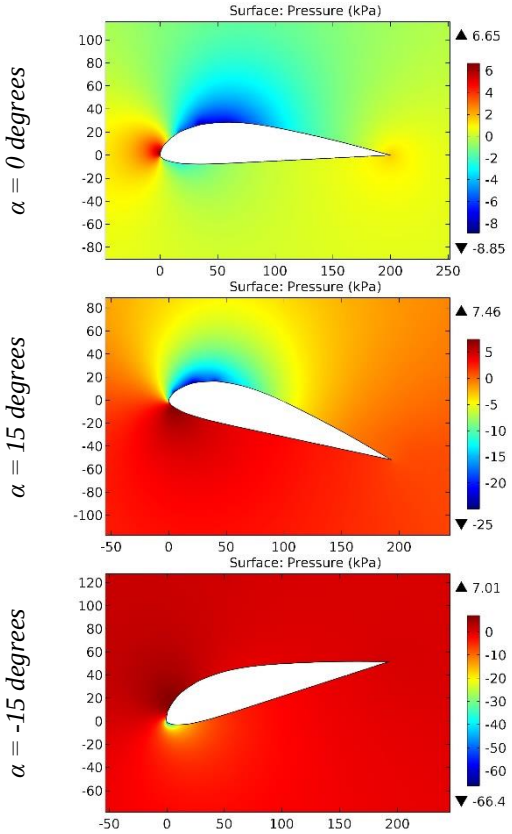


Figure 47. The pressure contours on the surfaces of the GOE 604 airfoil.

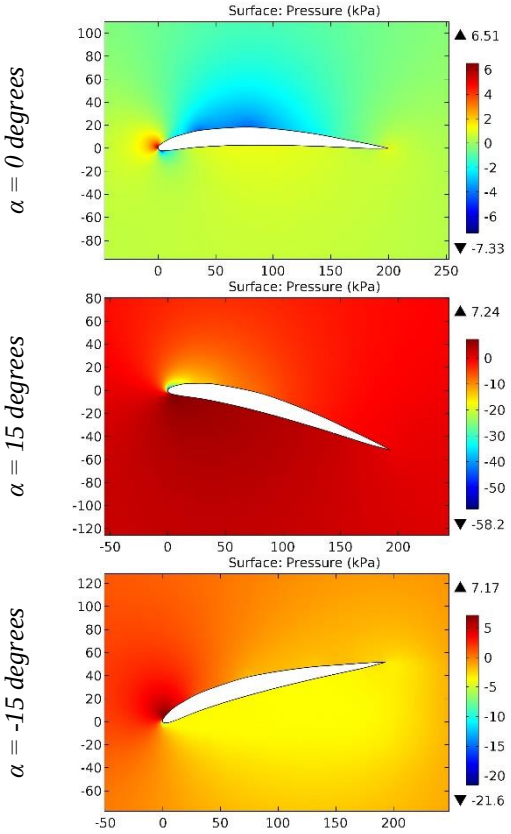


Figure 48. The pressure contours on the surfaces of the GOE 610 B airfoil.

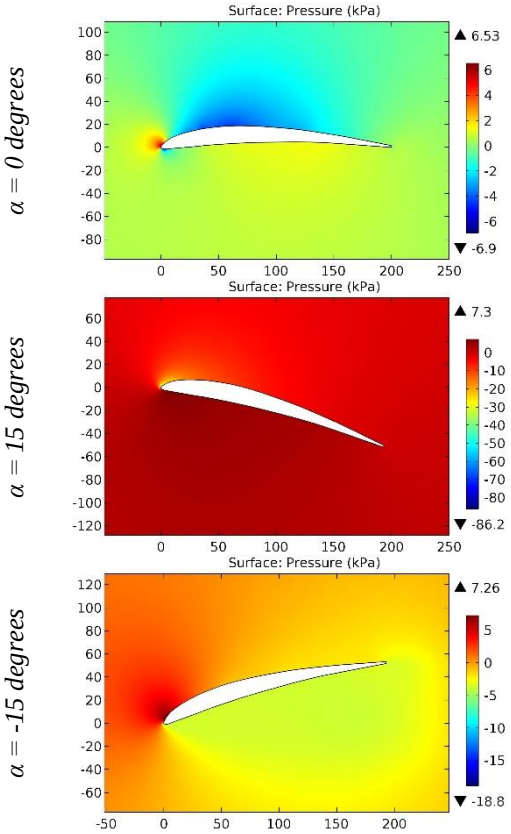


Figure 49. The pressure contours on the surfaces of the GOE 610-B MOD, airfoil.

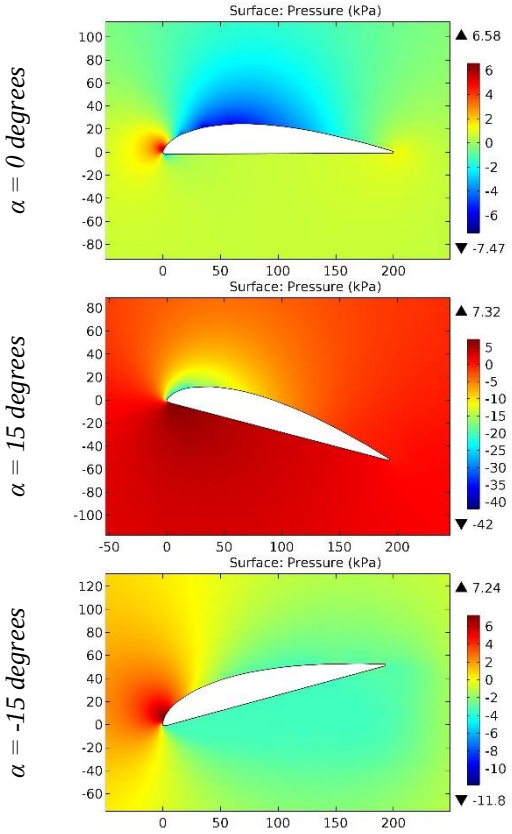


Figure 50. The pressure contours on the surfaces of the GOE 611 airfoil.

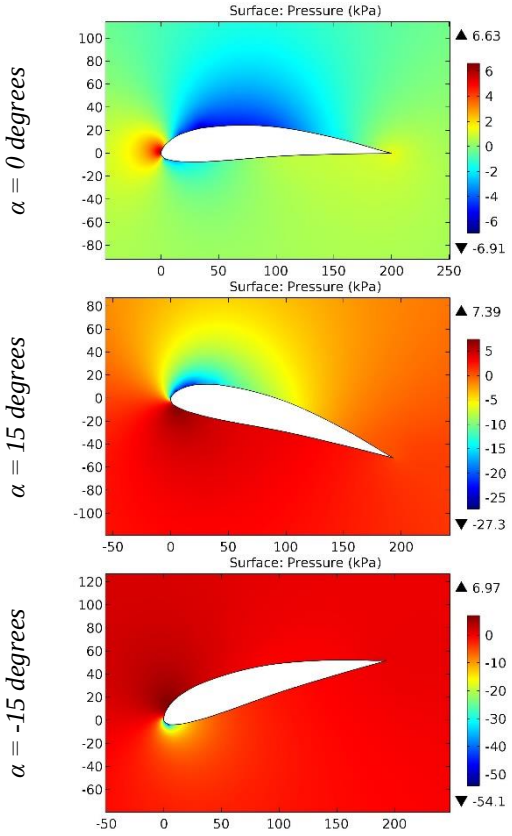


Figure 51. The pressure contours on the surfaces of the GOE 612 airfoil.

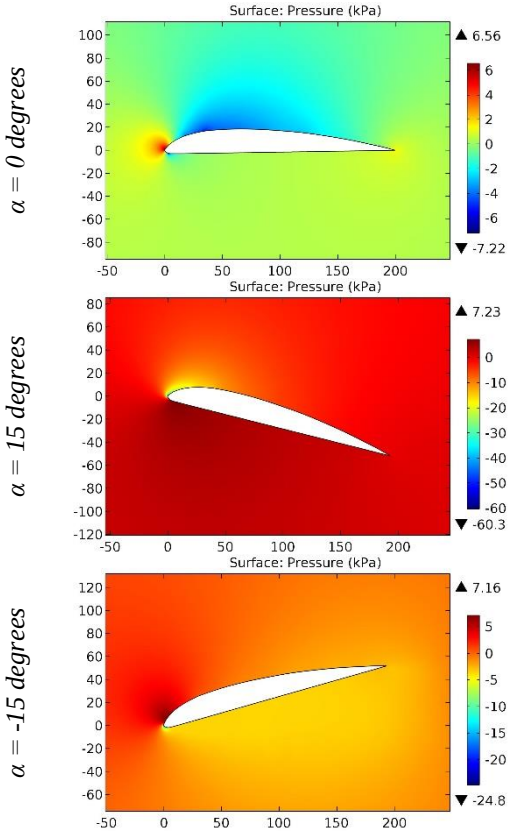


Figure 52. The pressure contours on the surfaces of the GOE 613 airfoil.

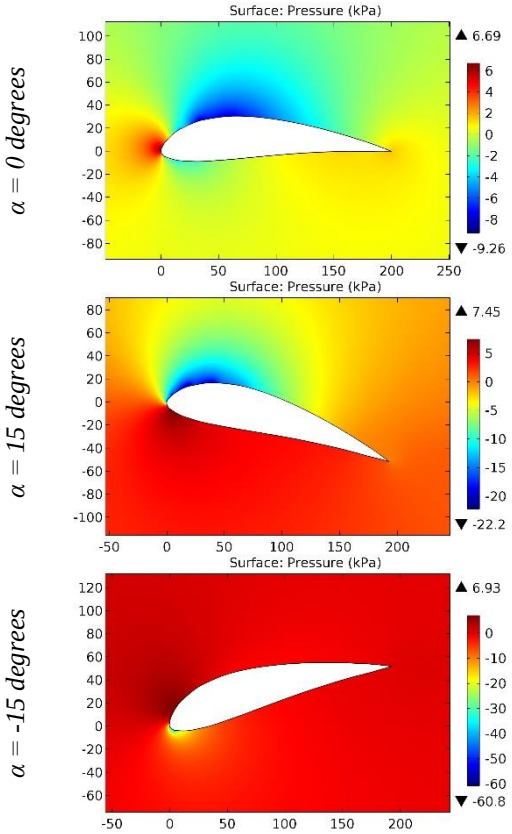


Figure 53. The pressure contours on the surfaces of the GOE 614 airfoil.

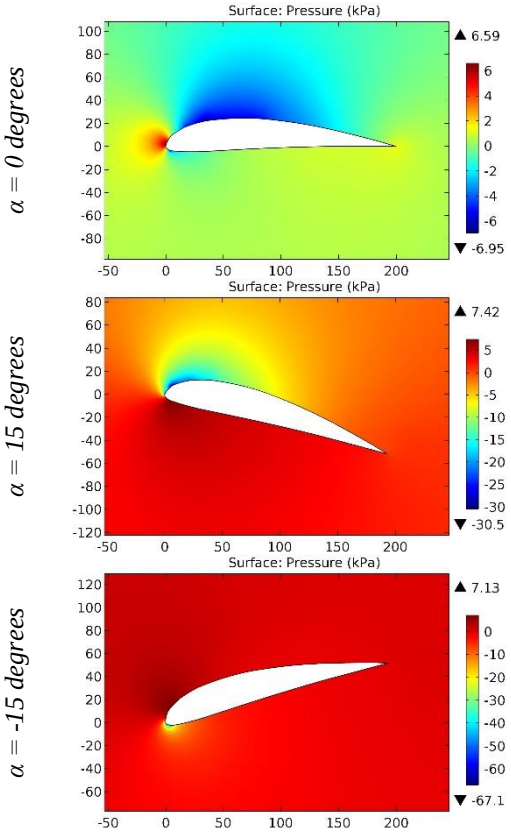


Figure 54. The pressure contours on the surfaces of the GOE 615 airfoil.

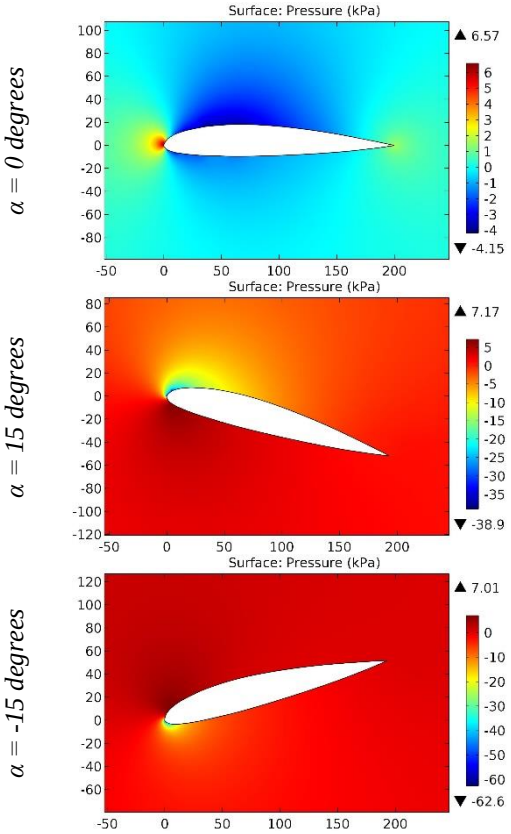


Figure 55. The pressure contours on the surfaces of the GOE 617 airfoil.

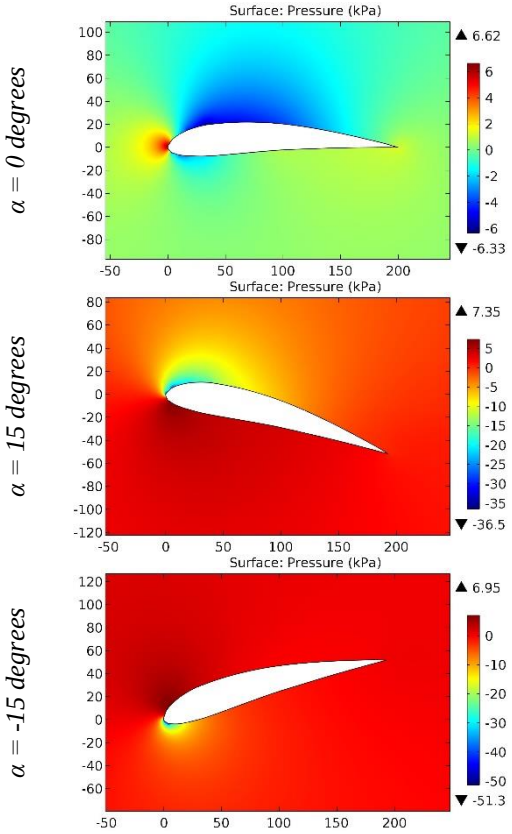


Figure 56. The pressure contours on the surfaces of the GOE 619 airfoil.

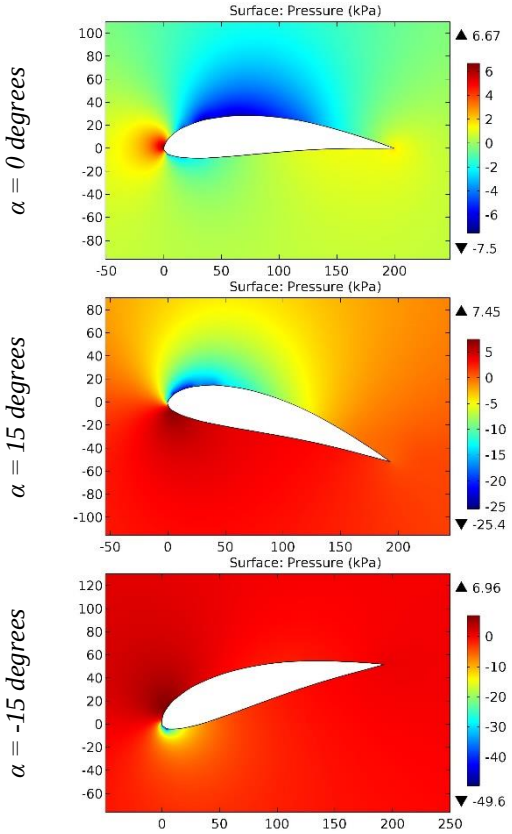


Figure 57. The pressure contours on the surfaces of the GOE 620 airfoil.

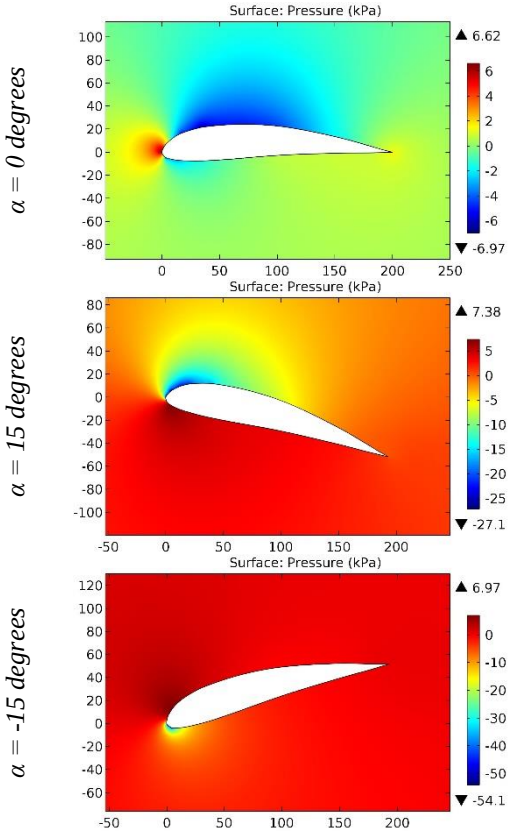


Figure 58. The pressure contours on the surfaces of the GOE 621 airfoil.

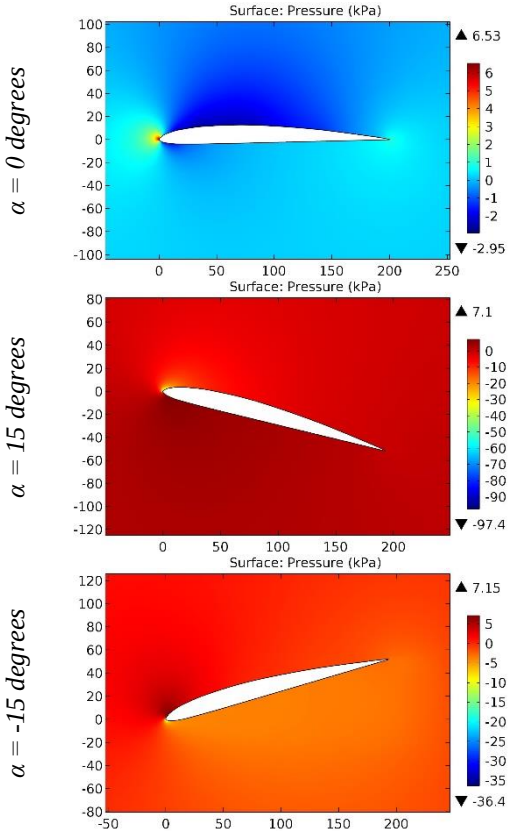


Figure 59. The pressure contours on the surfaces of the GOE 622 airfoil.

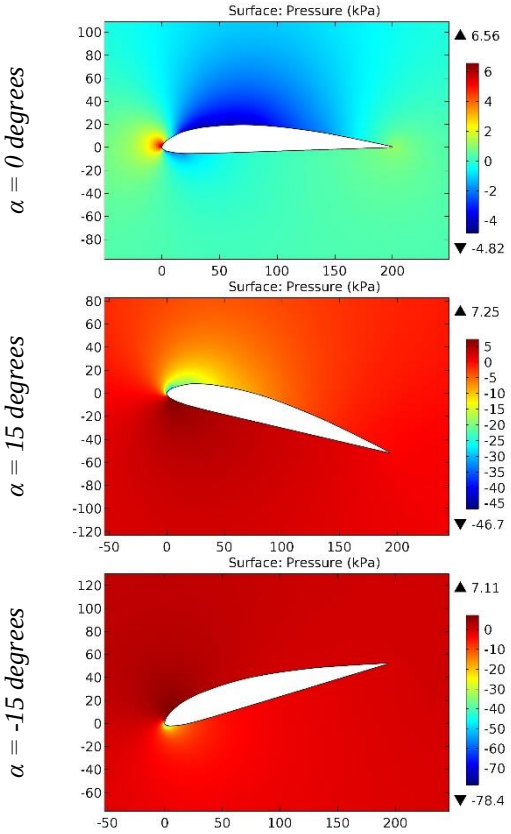


Figure 60. The pressure contours on the surfaces of the GOE 623 airfoil.

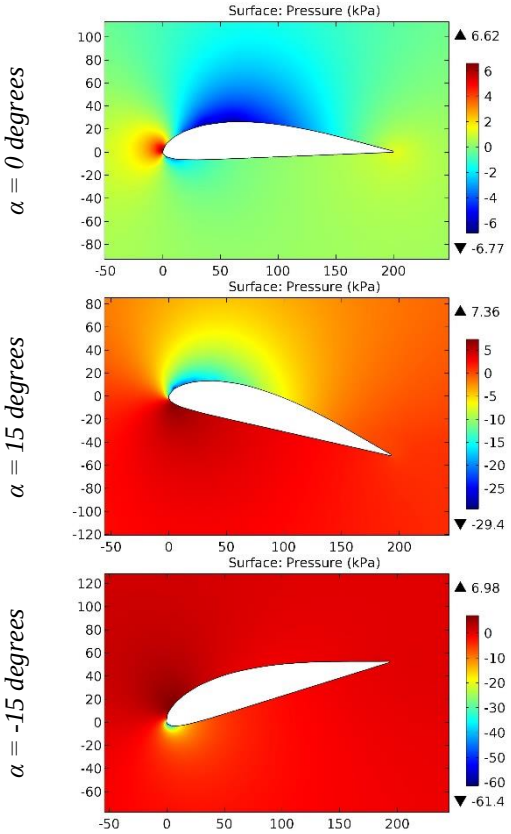


Figure 61. The pressure contours on the surfaces of the GOE 624 airfoil.

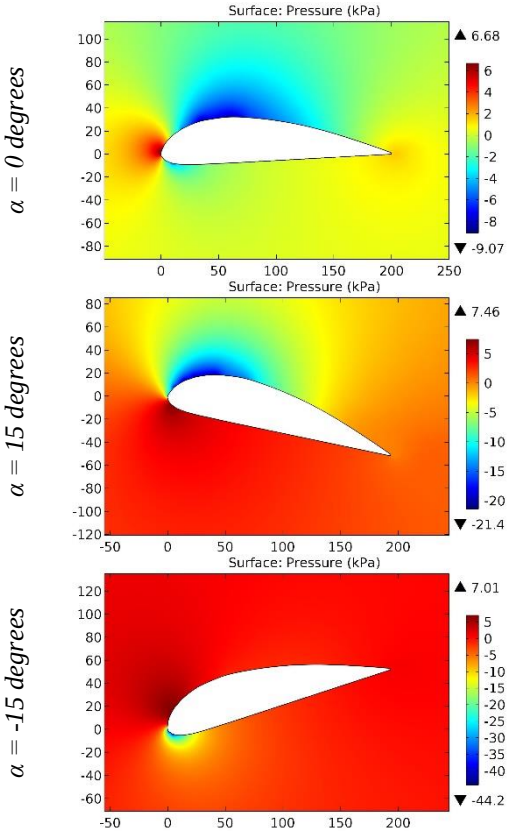


Figure 62. The pressure contours on the surfaces of the GOE 625 airfoil.

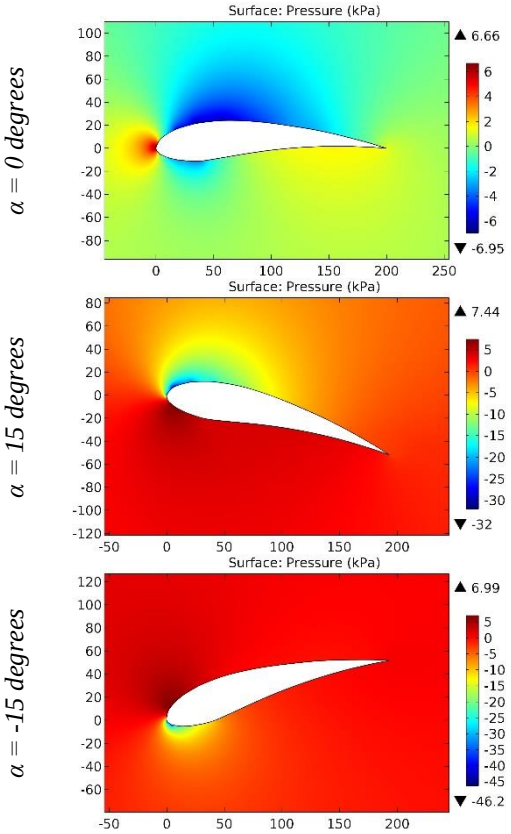


Figure 63. The pressure contours on the surfaces of the GOE 626 airfoil.

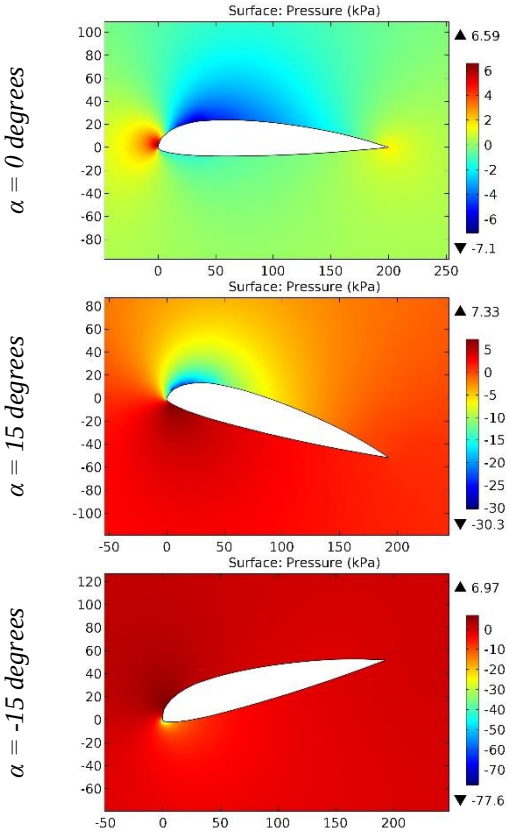


Figure 64. The pressure contours on the surfaces of the GOE 627 airfoil.

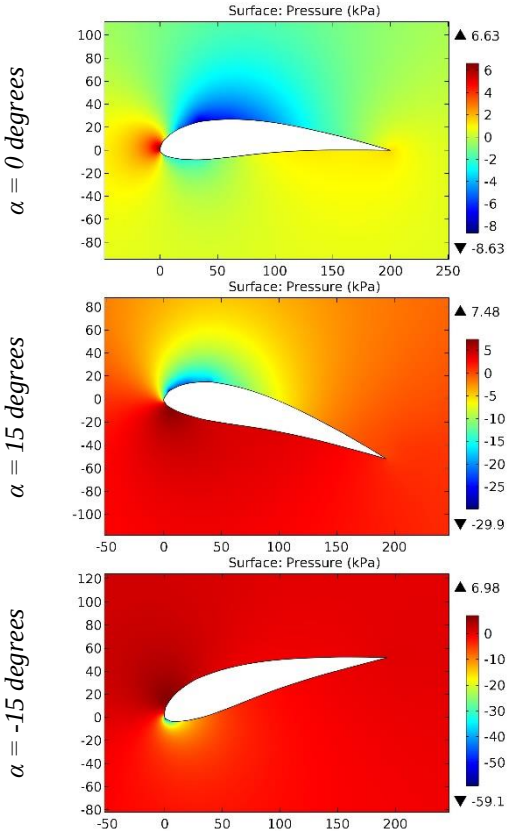


Figure 65. The pressure contours on the surfaces of the GOE 628 airfoil.

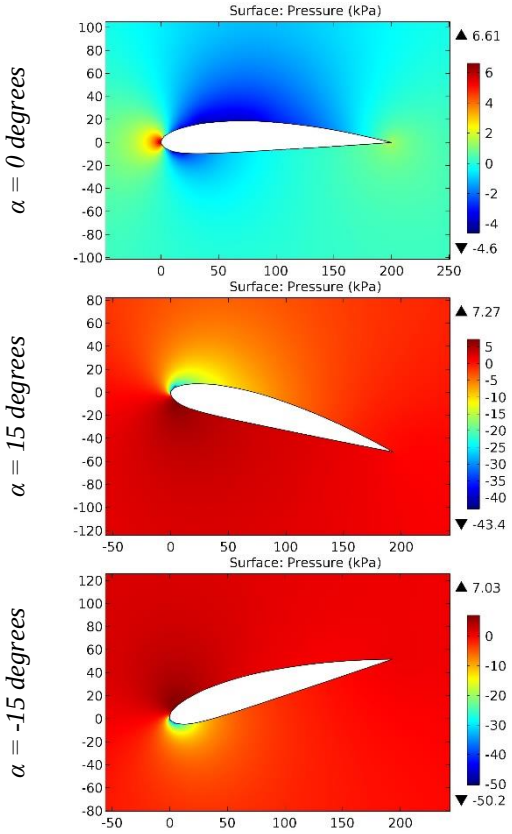


Figure 66. The pressure contours on the surfaces of the GOE 629 airfoil.

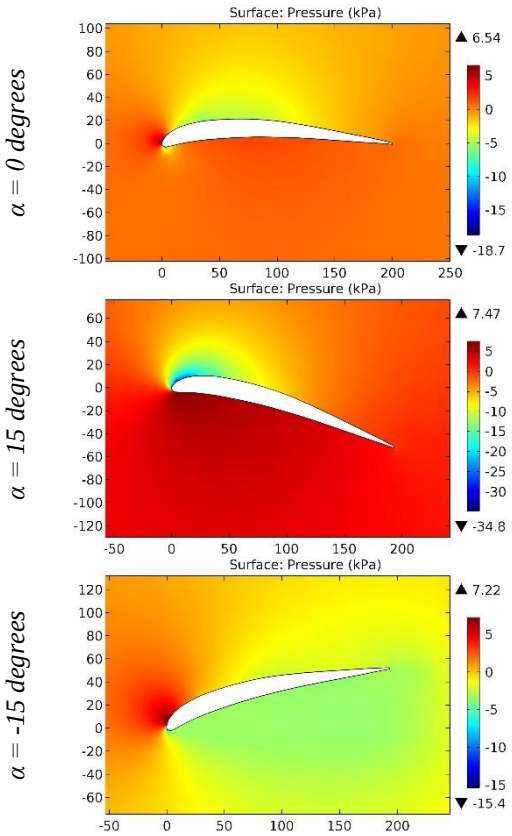


Figure 67. The pressure contours on the surfaces of the GOE 63 airfoil.

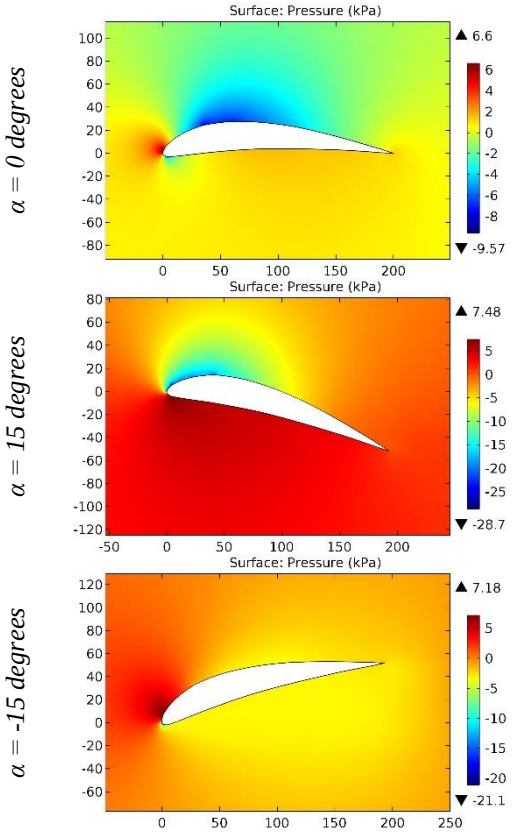


Figure 68. The pressure contours on the surfaces of the GOE 630 airfoil.

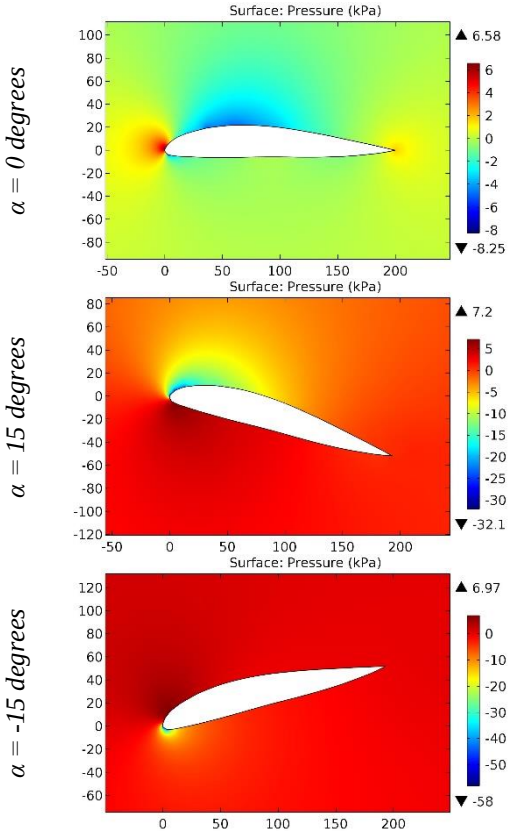


Figure 69. The pressure contours on the surfaces of the GOE 632 airfoil.

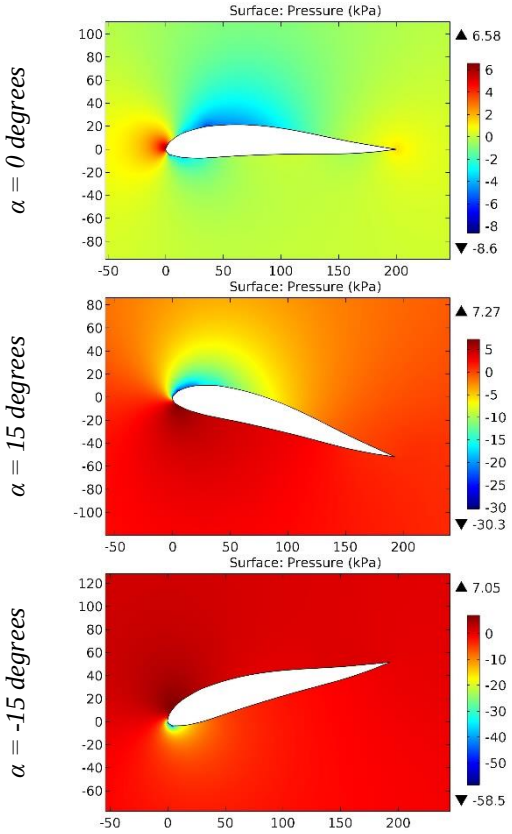


Figure 70. The pressure contours on the surfaces of the GOE 633 airfoil.

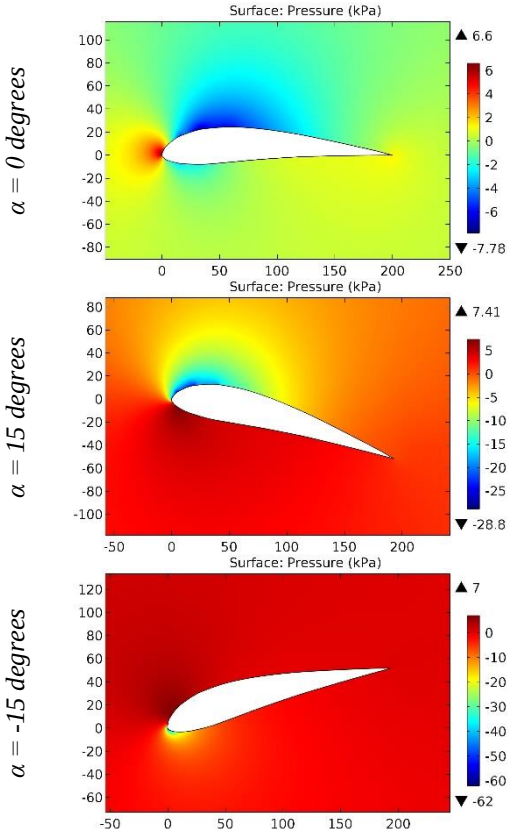


Figure 71. The pressure contours on the surfaces of the GOE 645 airfoil.

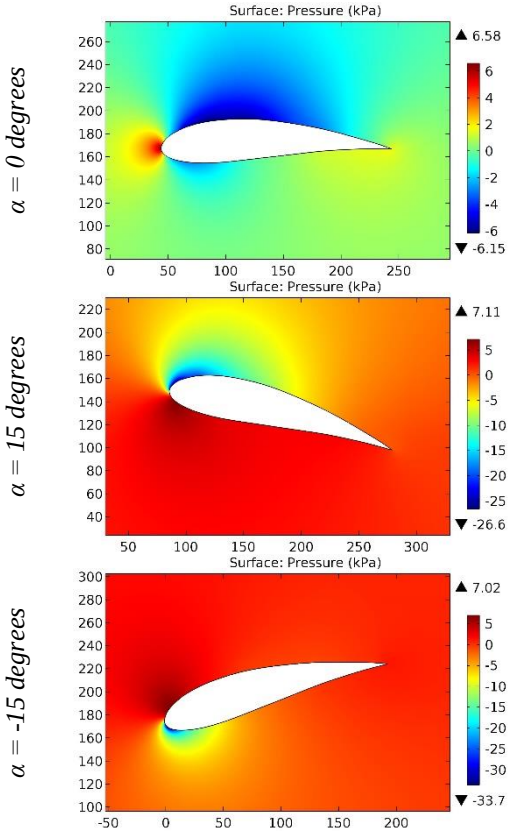


Figure 72. The pressure contours on the surfaces of the GOE 646 airfoil.

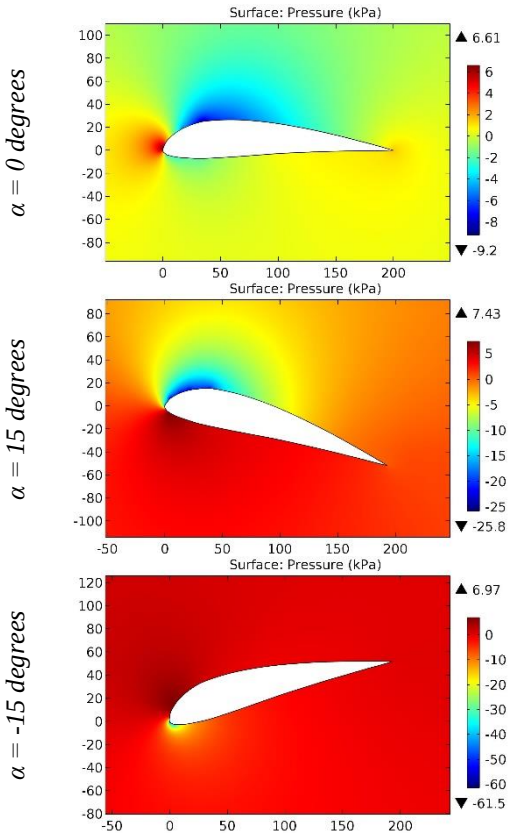


Figure 73. The pressure contours on the surfaces of the GOE 647 airfoil.

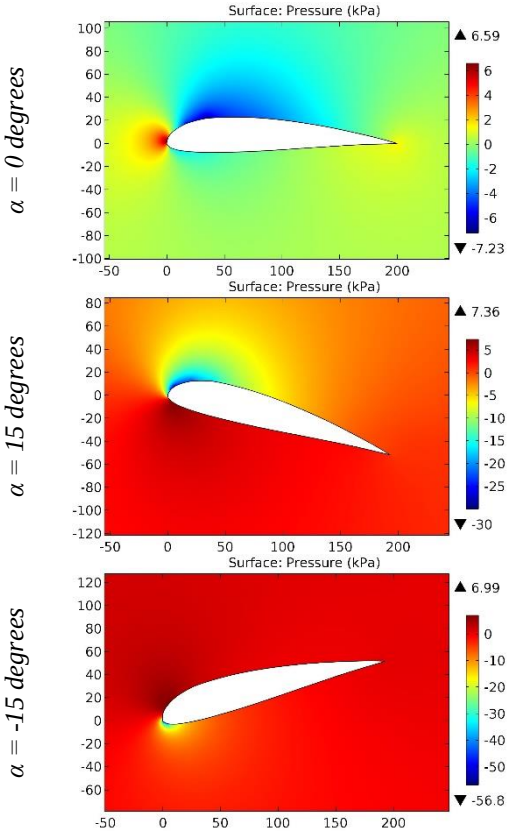


Figure 74. The pressure contours on the surfaces of the GOE 648 airfoil.

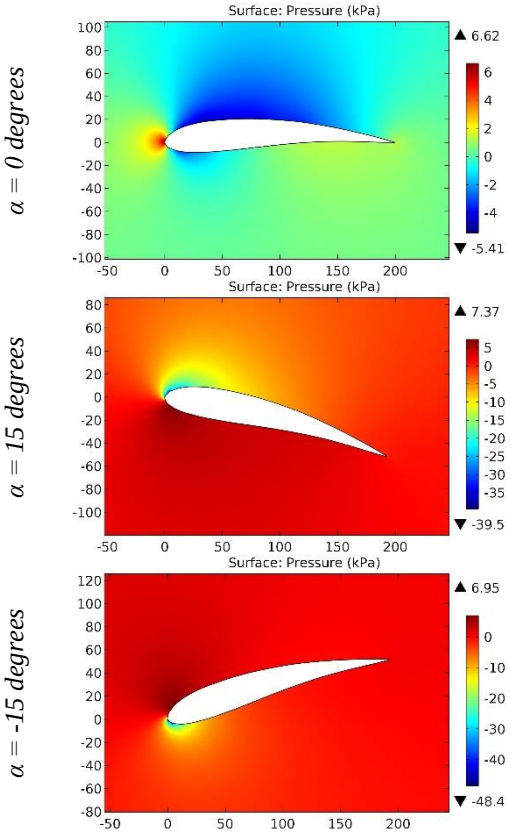


Figure 75. The pressure contours on the surfaces of the GOE 650 airfoil.

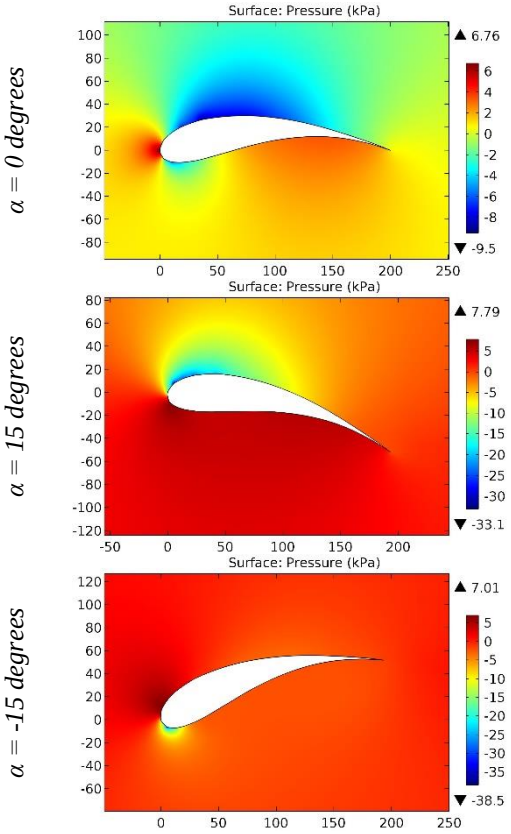


Figure 76. The pressure contours on the surfaces of the GOE 652 airfoil.

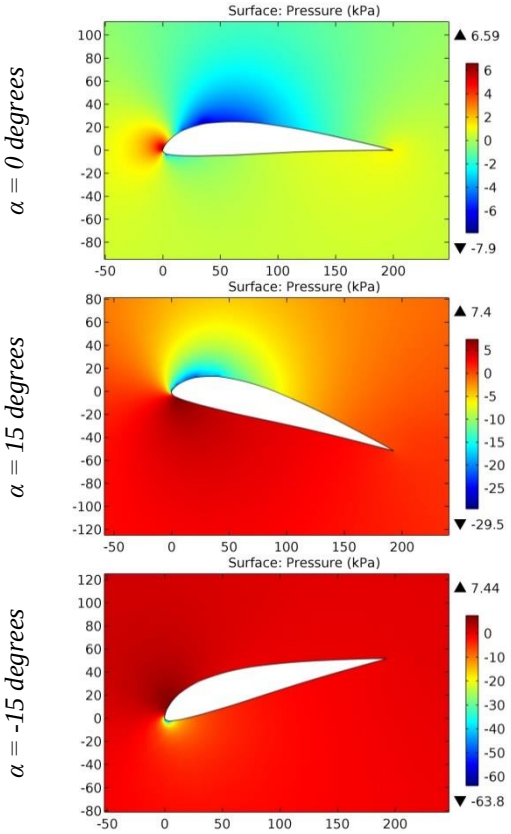


Figure 77. The pressure contours on the surfaces of the GOE 654 airfoil.

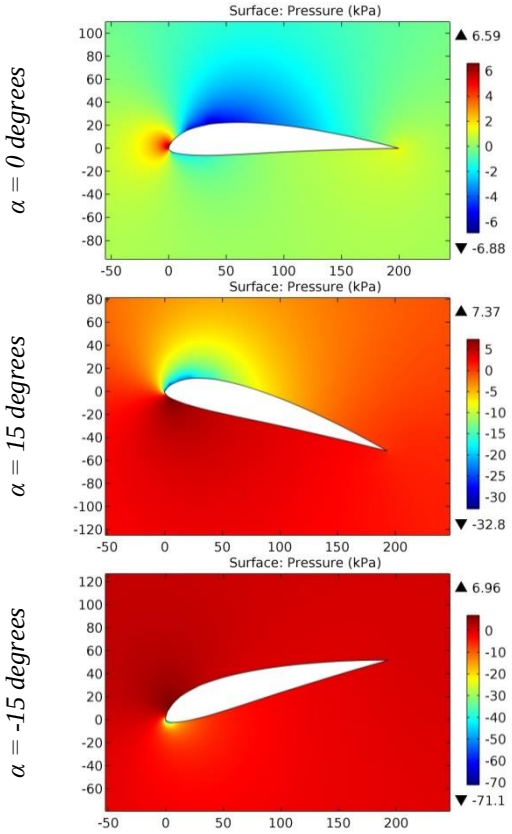


Figure 78. The pressure contours on the surfaces of the GOE 655 airfoil.

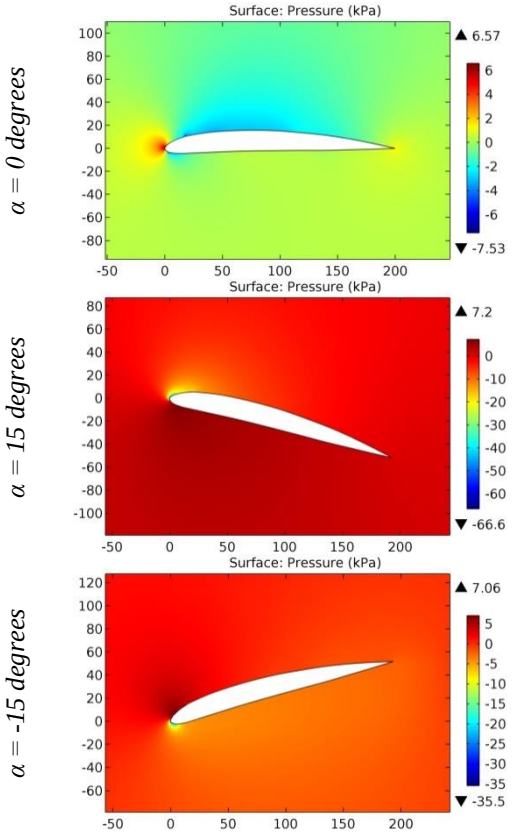


Figure 79. The pressure contours on the surfaces of the GOE 670 airfoil.

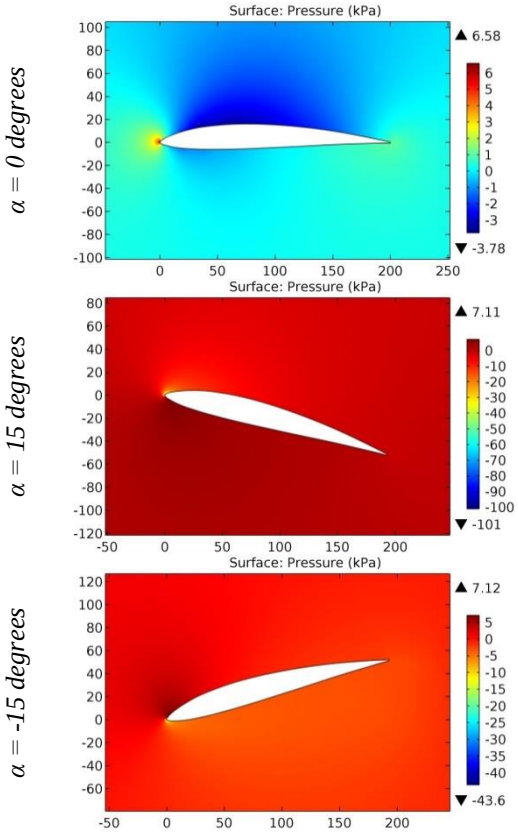


Figure 80. The pressure contours on the surfaces of the GOE 673 airfoil.

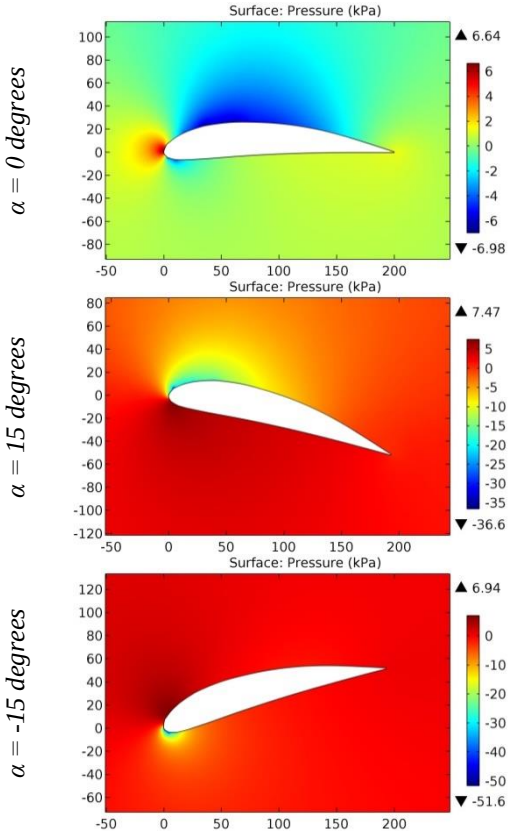


Figure 81. The pressure contours on the surfaces of the GOE 675 airfoil.

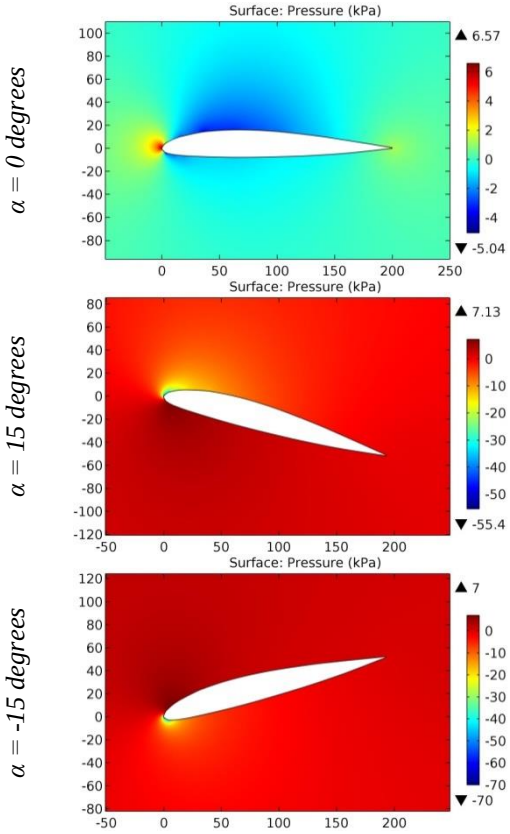


Figure 82. The pressure contours on the surfaces of the GOE 676 (= M 12) airfoil.

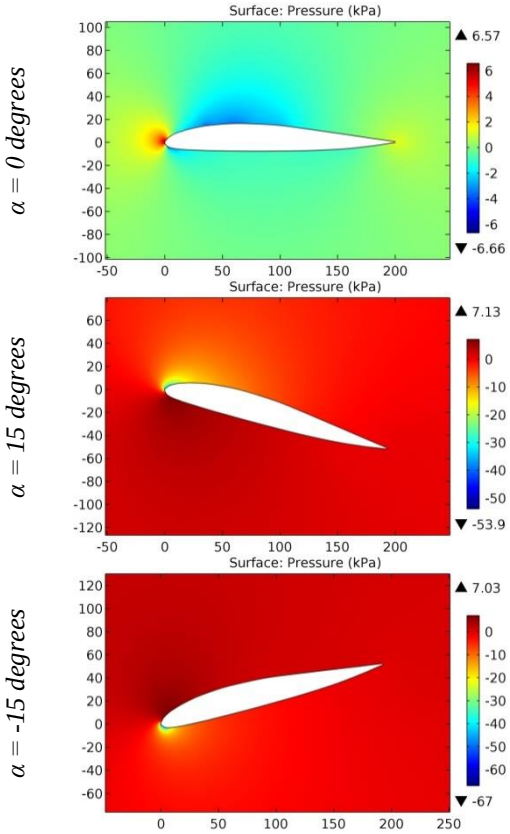


Figure 83. The pressure contours on the surfaces of the GOE 677 (= M 6) airfoil.

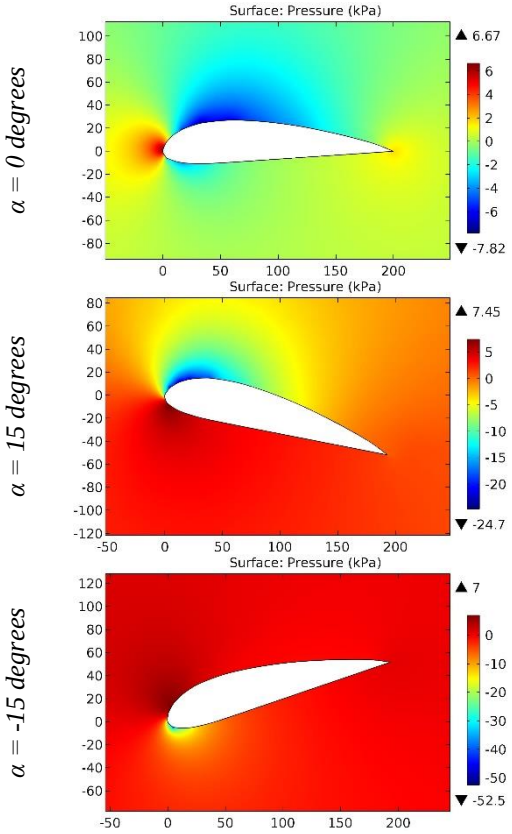


Figure 84. The pressure contours on the surfaces of the GOE 679 airfoil.

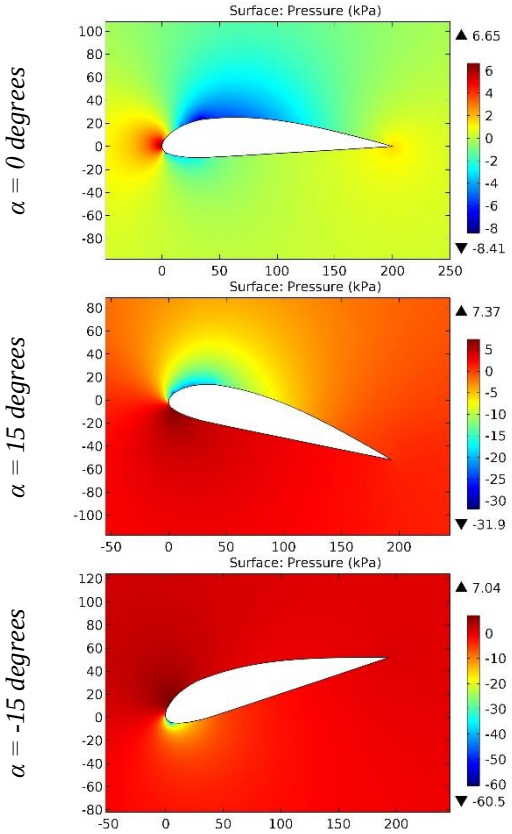


Figure 85. The pressure contours on the surfaces of the GOE 681 airfoil.

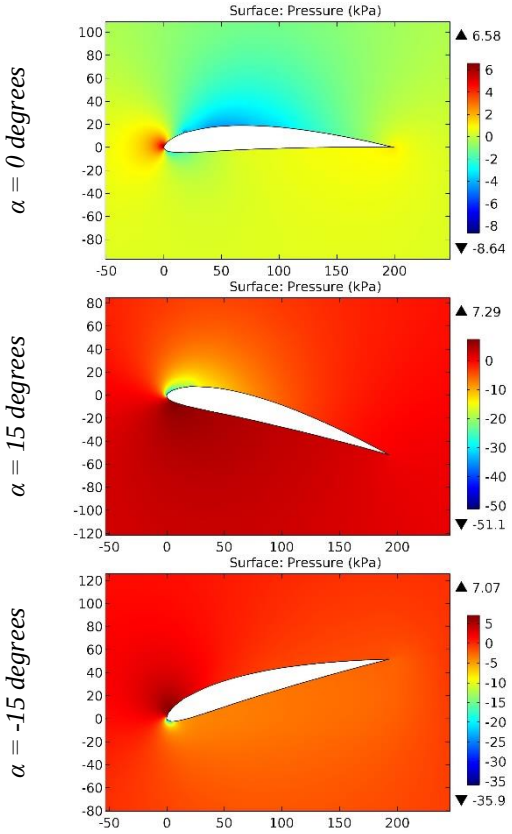


Figure 86. The pressure contours on the surfaces of the GOE 682 airfoil.

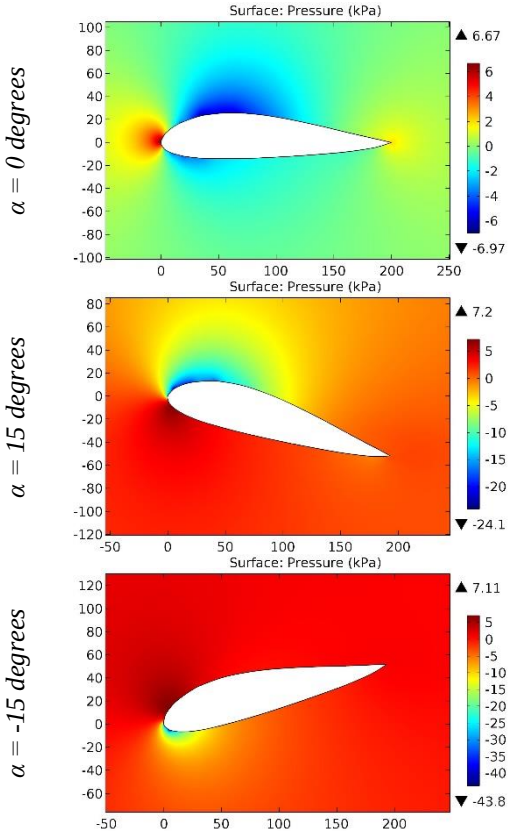


Figure 87. The pressure contours on the surfaces of the GOE 683 airfoil.

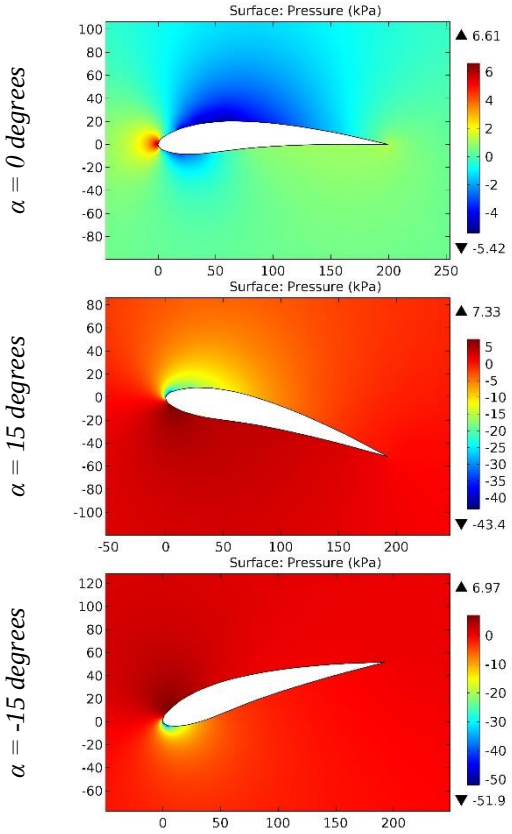


Figure 88. The pressure contours on the surfaces of the GOE 685 airfoil.

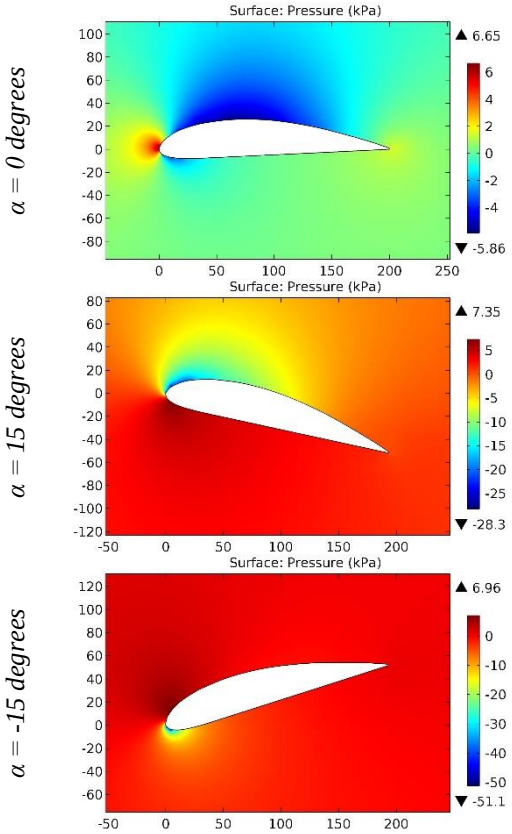


Figure 89. The pressure contours on the surfaces of the GOE 692 airfoil.

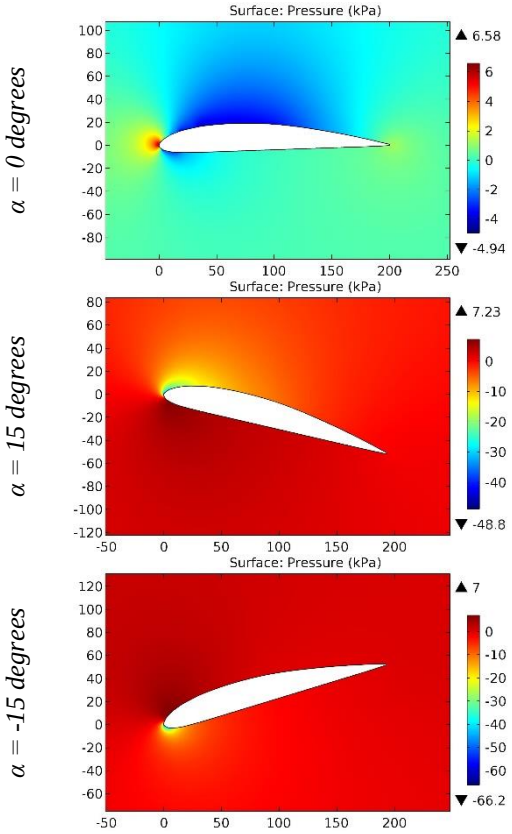


Figure 90. The pressure contours on the surfaces of the GOE 693 airfoil.

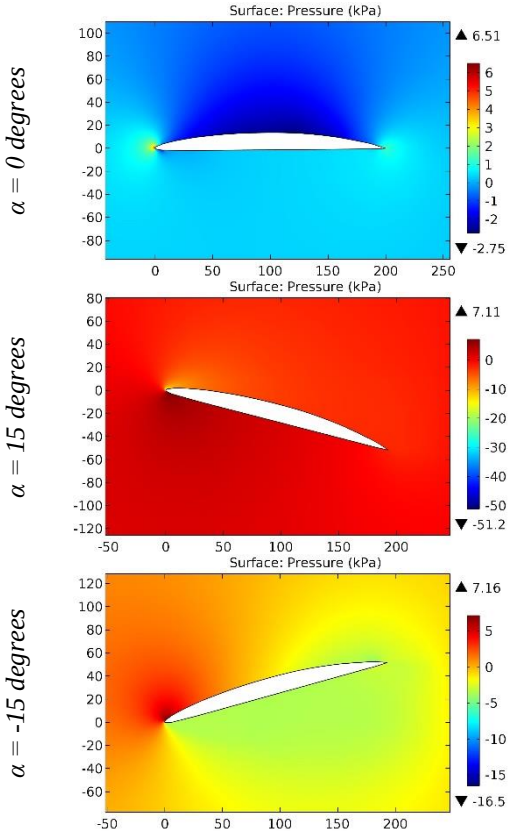


Figure 91. The pressure contours on the surfaces of the GOE 6K airfoil.

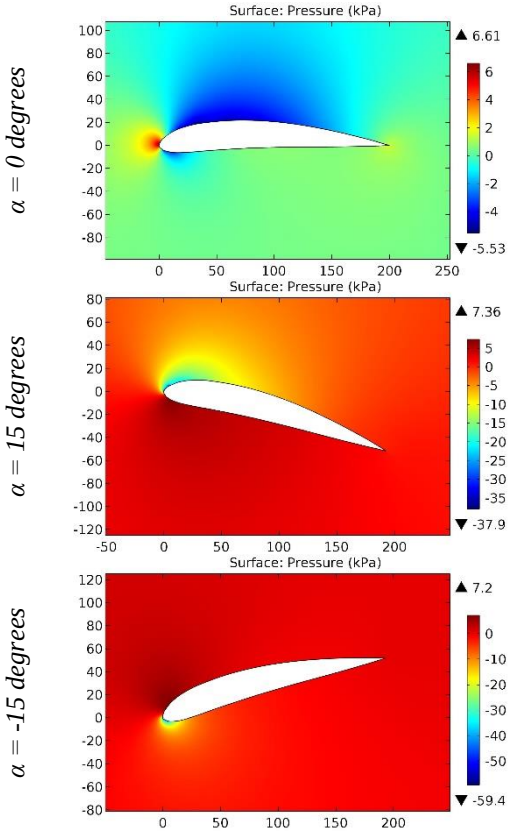


Figure 92. The pressure contours on the surfaces of the GOE 701 airfoil.

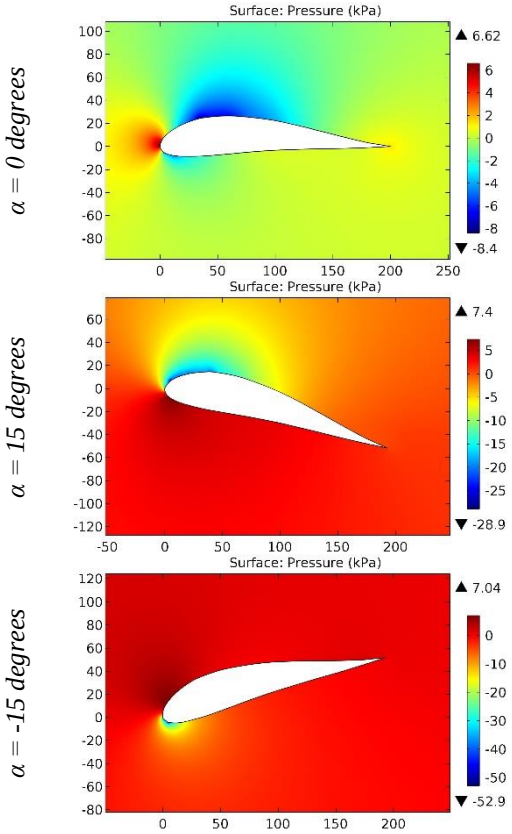


Figure 93. The pressure contours on the surfaces of the GOE 702 airfoil.

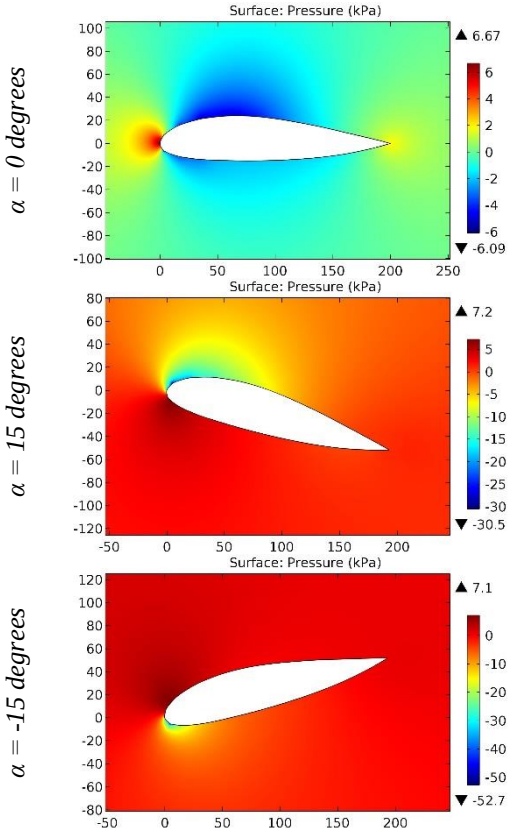


Figure 94. The pressure contours on the surfaces of the GOE 703 airfoil.

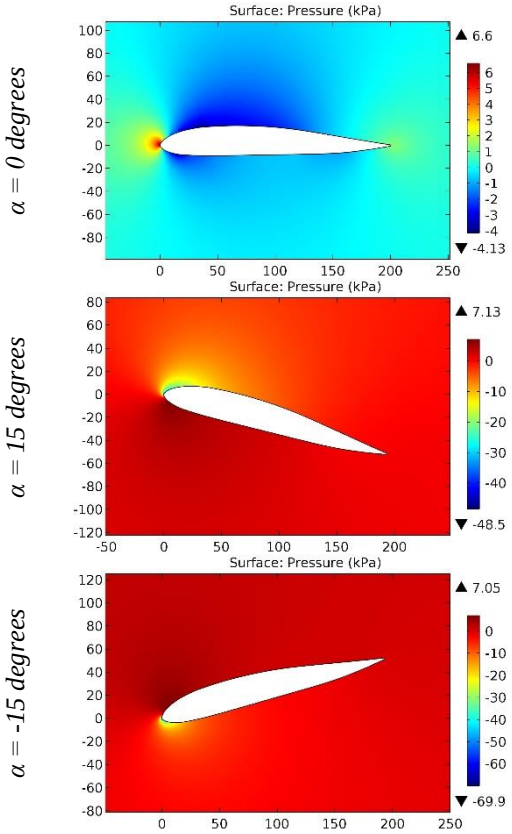


Figure 95. The pressure contours on the surfaces of the GOE 704 airfoil.

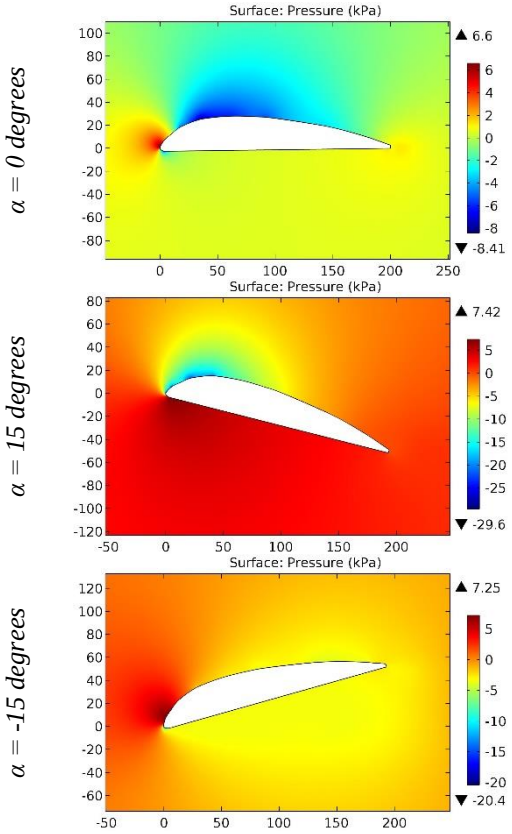


Figure 96. The pressure contours on the surfaces of the GOE 711 airfoil.

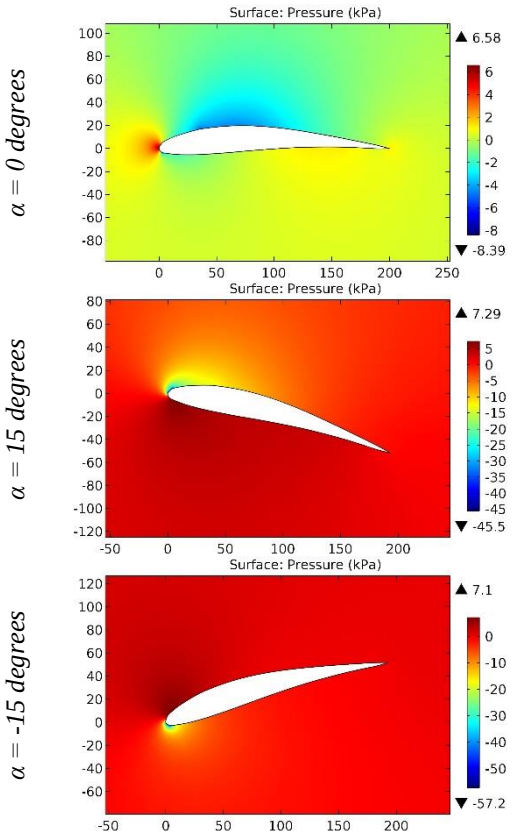


Figure 97. The pressure contours on the surfaces of the GOE 723 airfoil.

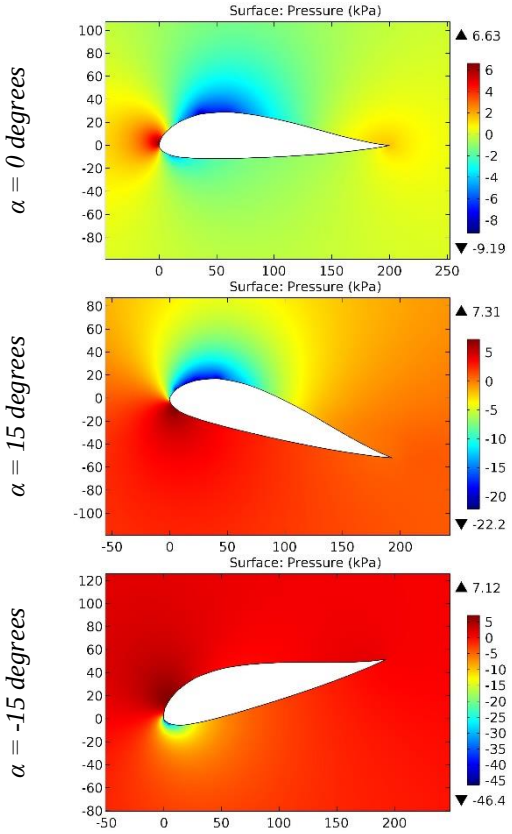


Figure 98. The pressure contours on the surfaces of the GOE 735 airfoil.

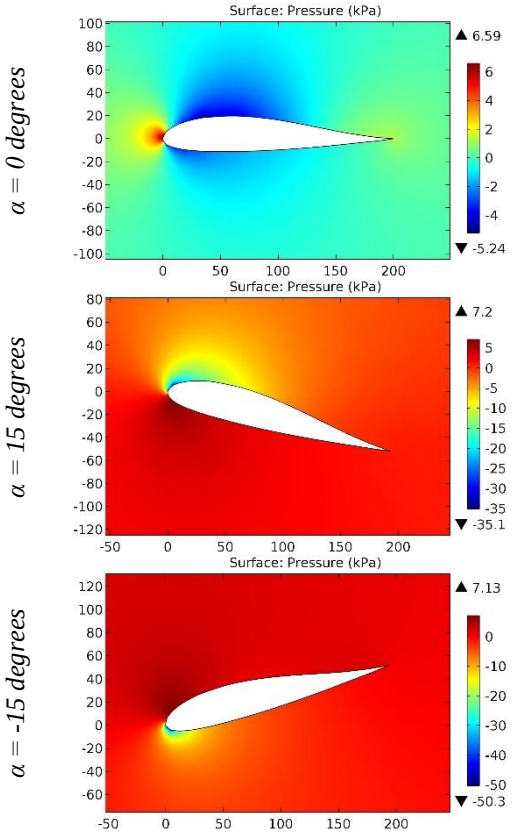


Figure 99. The pressure contours on the surfaces of the GOE 738 airfoil.

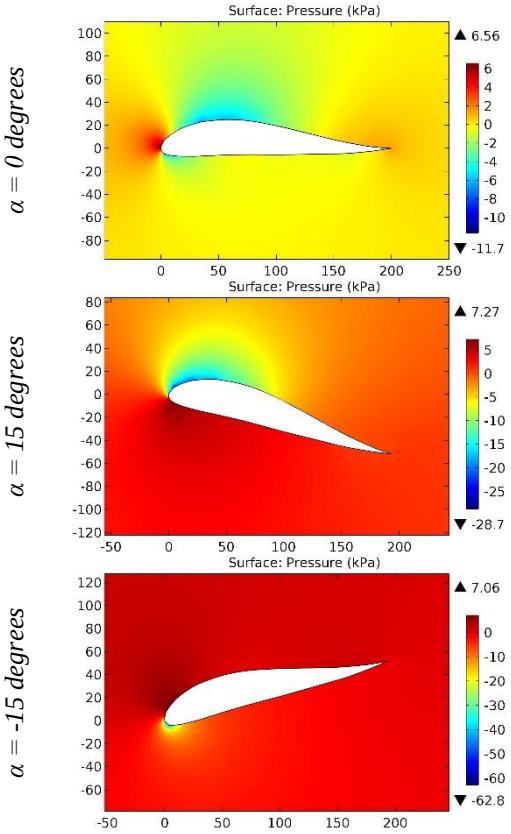


Figure 100. The pressure contours on the surfaces of the GOE 741 airfoil.

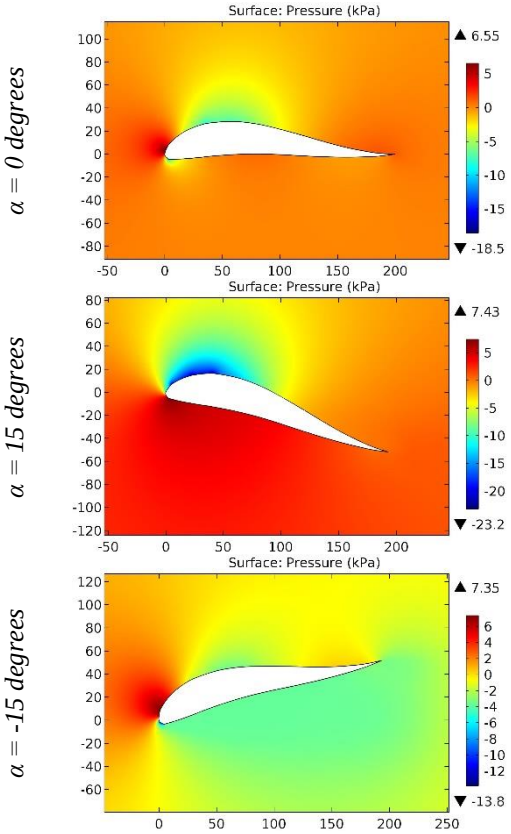


Figure 101. The pressure contours on the surfaces of the GOE 744 airfoil.

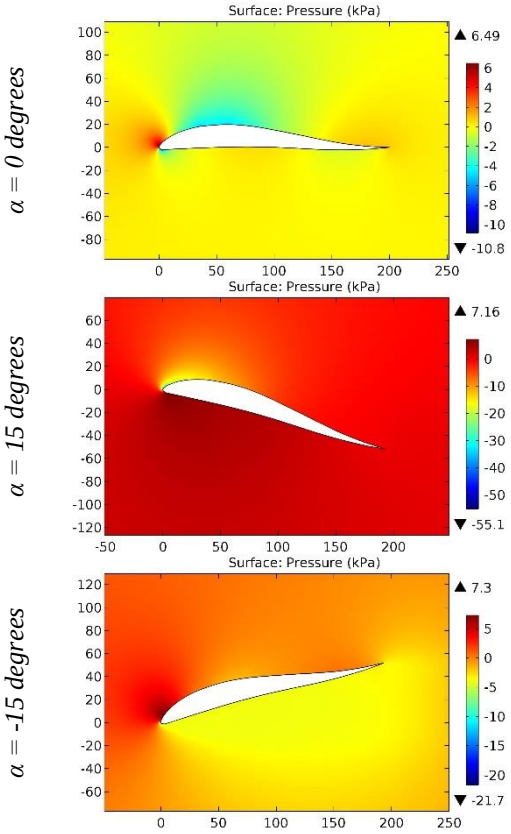


Figure 102. The pressure contours on the surfaces of the GOE 746 airfoil.

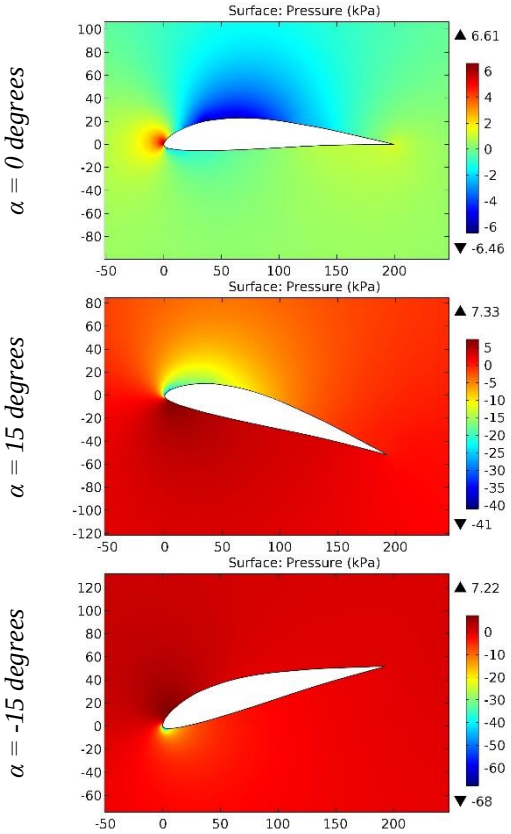


Figure 103. The pressure contours on the surfaces of the GOE 758 airfoil.

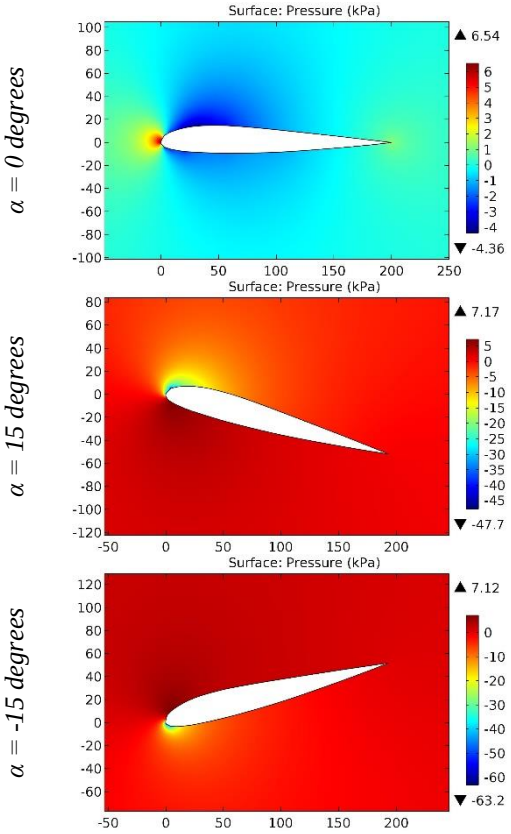


Figure 104. The pressure contours on the surfaces of the GOE 766 airfoil.

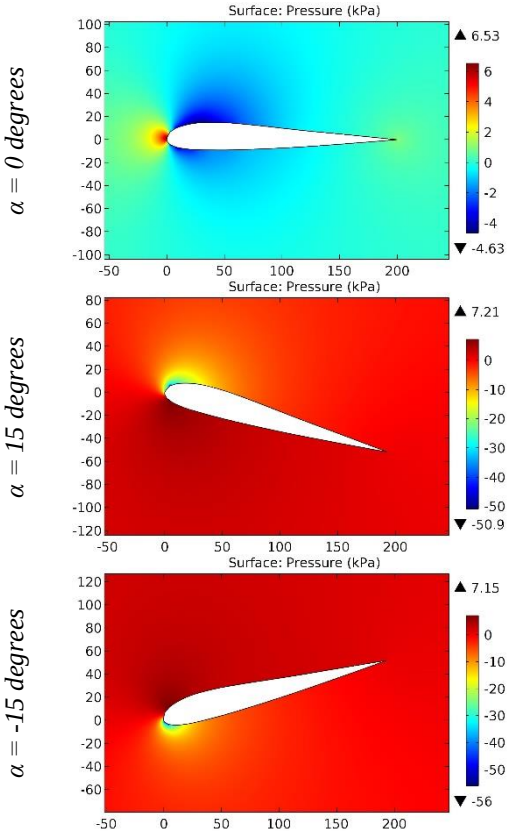


Figure 105. The pressure contours on the surfaces of the GOE 767 airfoil.

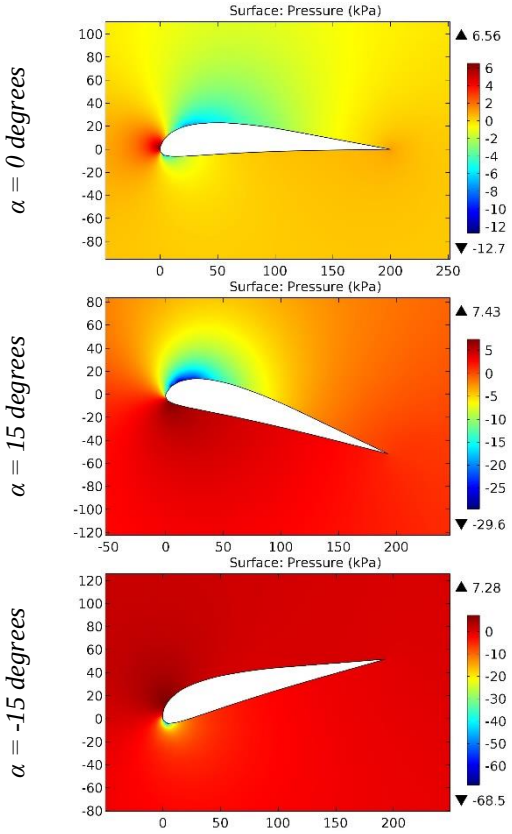


Figure 106. The pressure contours on the surfaces of the GOE 769 airfoil.

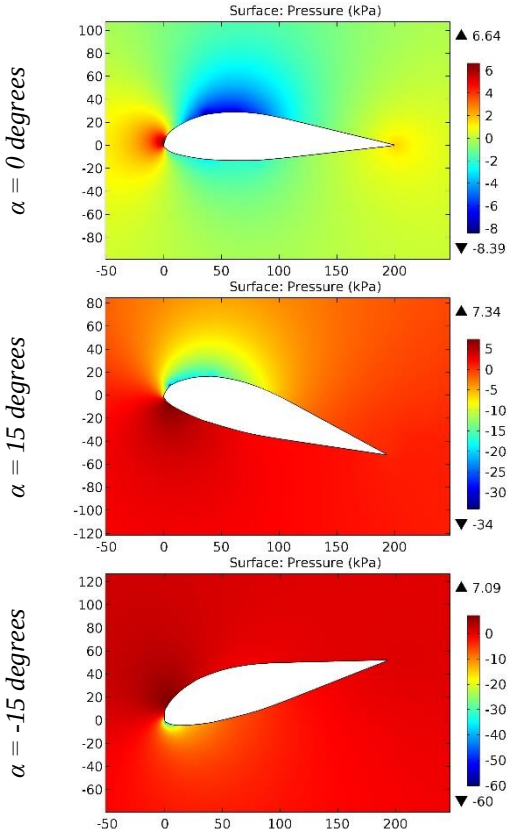


Figure 107. The pressure contours on the surfaces of the GOE 770 airfoil.

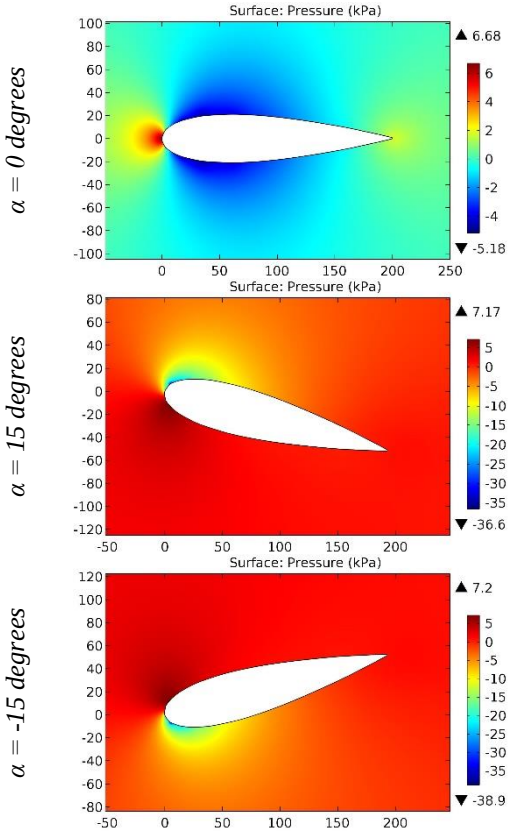


Figure 108. The pressure contours on the surfaces of the GOE 775 airfoil.

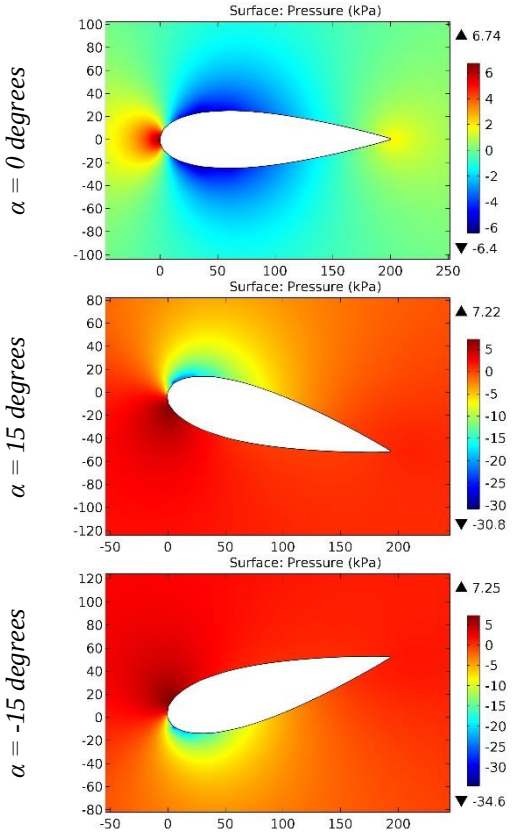


Figure 109. The pressure contours on the surfaces of the GOE 776 airfoil.

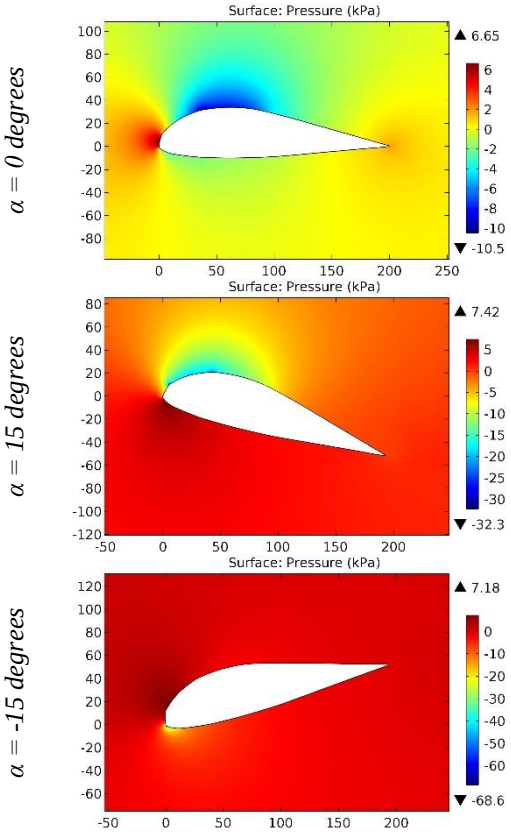


Figure 110. The pressure contours on the surfaces of the GOE 777 airfoil.

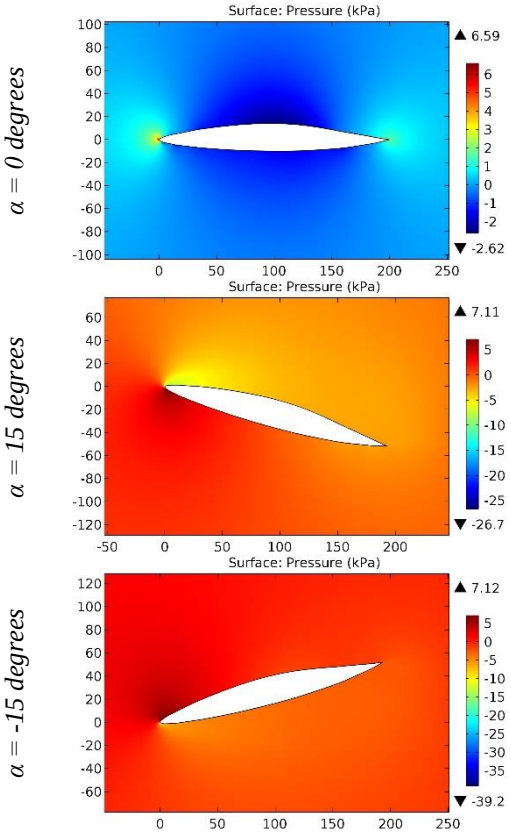


Figure 111. The pressure contours on the surfaces of the GOE 780 airfoil.

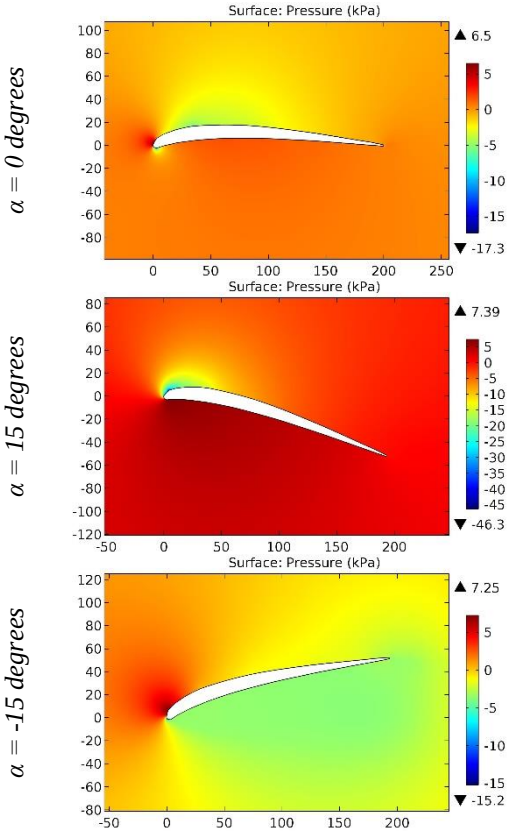


Figure 112. The pressure contours on the surfaces of the GOE 79 (PFALZ 11) airfoil.

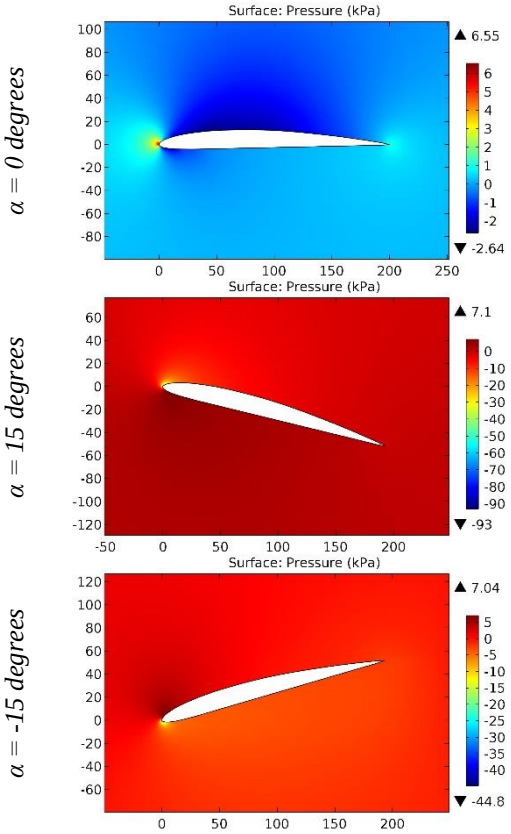


Figure 113. The pressure contours on the surfaces of the GOE 795 airfoil.

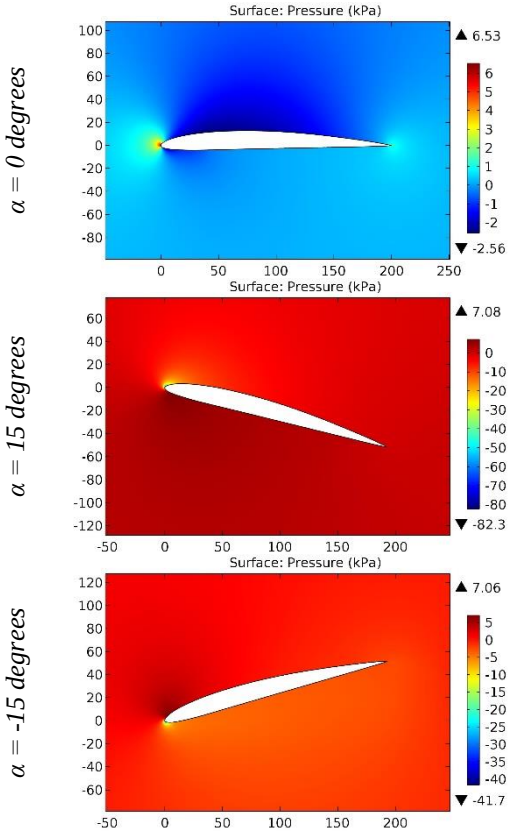


Figure 114. The pressure contours on the surfaces of the GOE 795 smoothed airfoil.

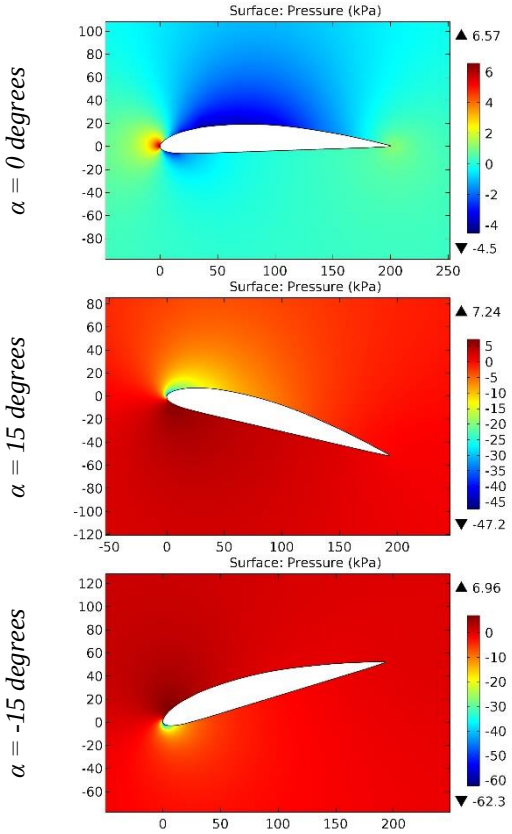


Figure 115. The pressure contours on the surfaces of the GOE 796 airfoil.

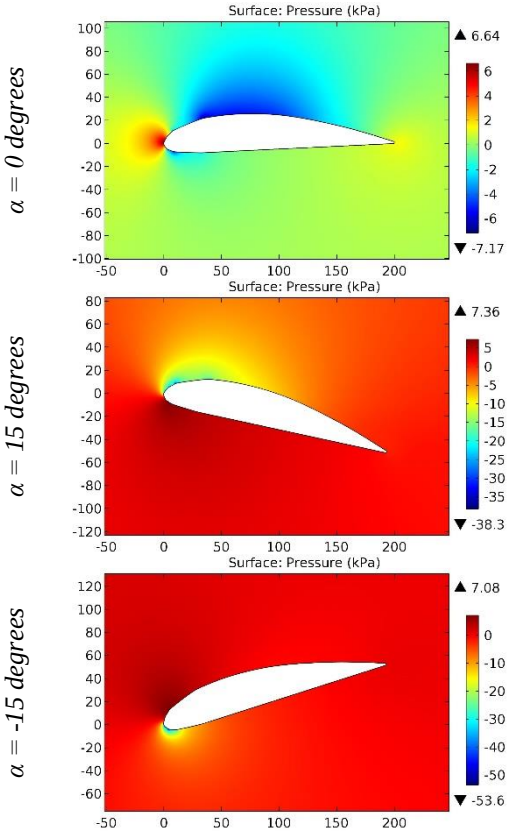


Figure 116. The pressure contours on the surfaces of the GOE 797 airfoil.

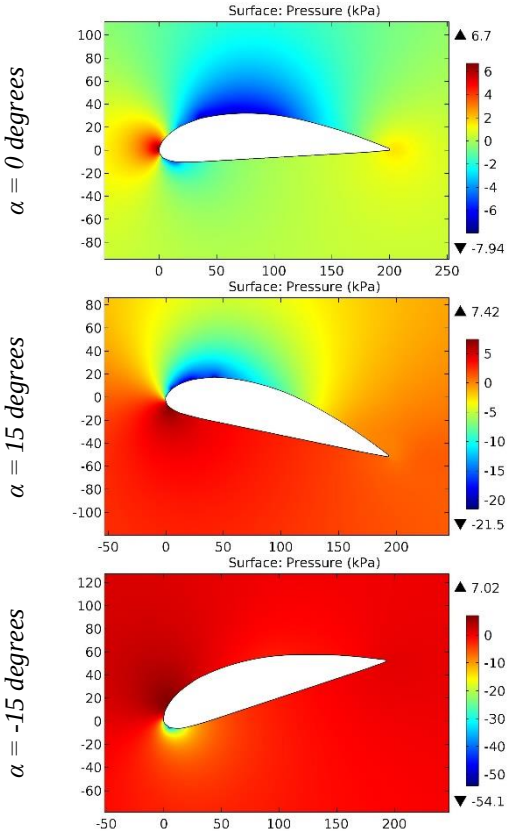


Figure 117. The pressure contours on the surfaces of the GOE 798 airfoil.

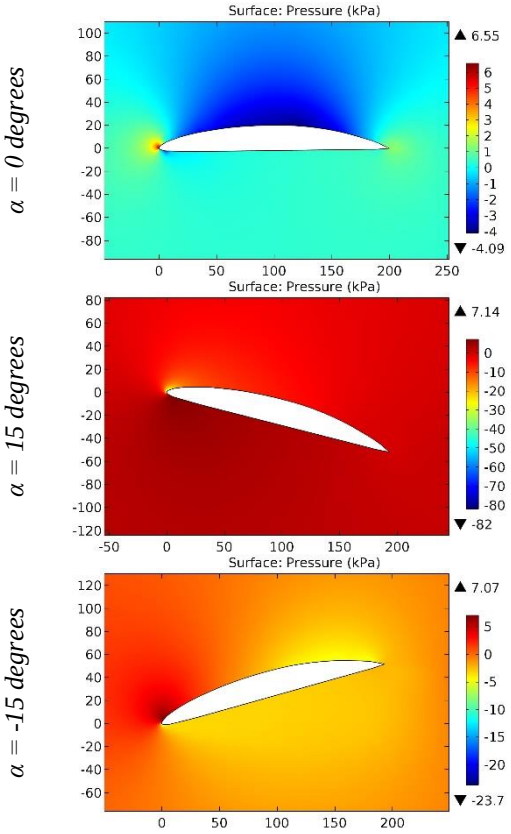


Figure 118. The pressure contours on the surfaces of the GOE 7K airfoil.

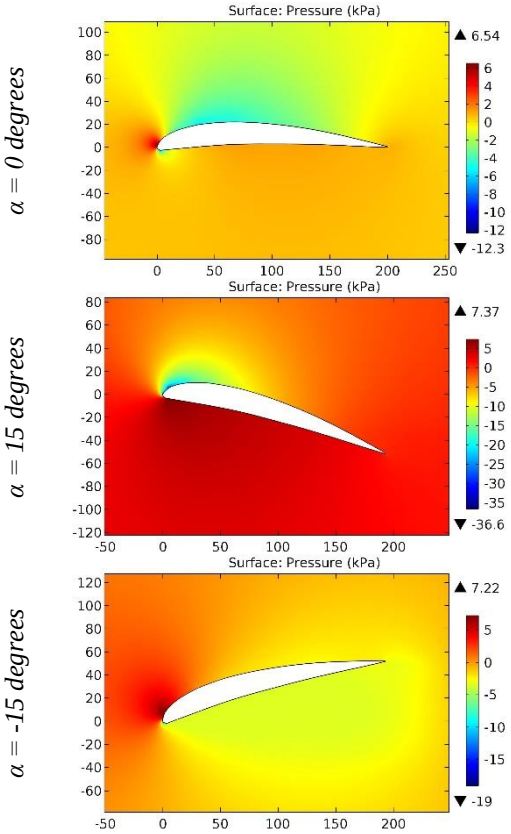


Figure 119. The pressure contours on the surfaces of the GOE 801 (MVA 301) airfoil.

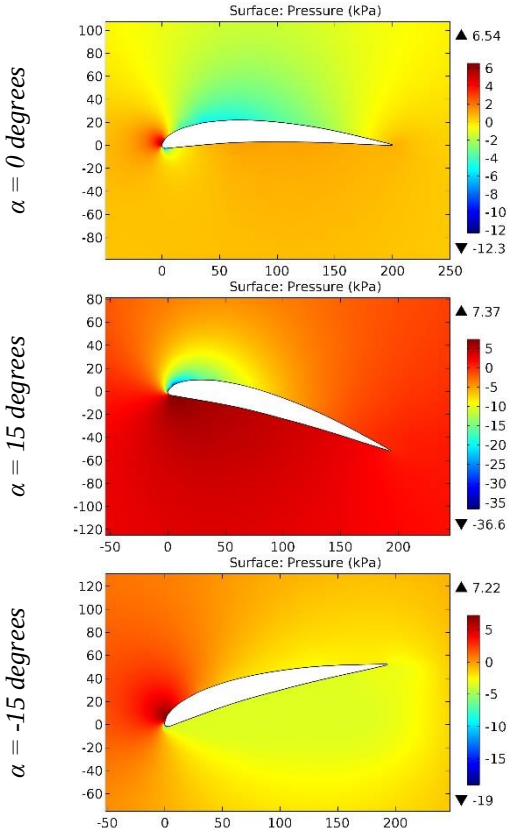


Figure 120. The pressure contours on the surfaces of the GOE 802 airfoil.

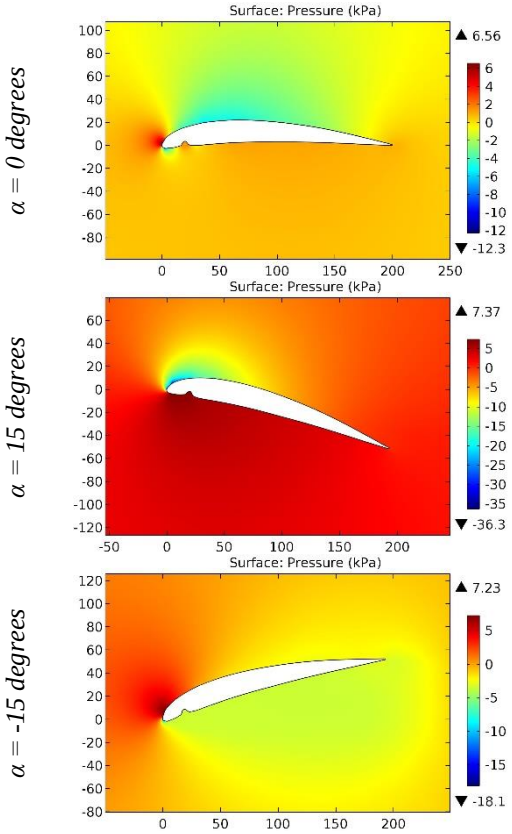


Figure 121. The pressure contours on the surfaces of the GOE 802 A airfoil.

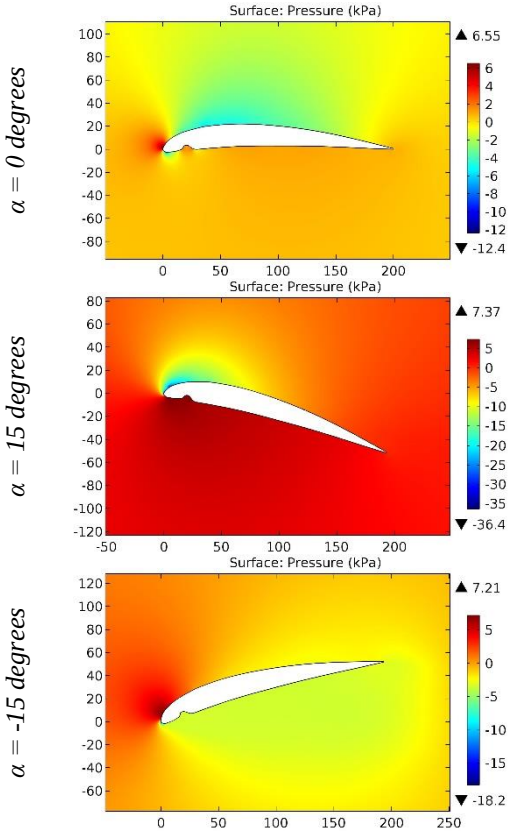


Figure 122. The pressure contours on the surfaces of the GOE 802 B airfoil.

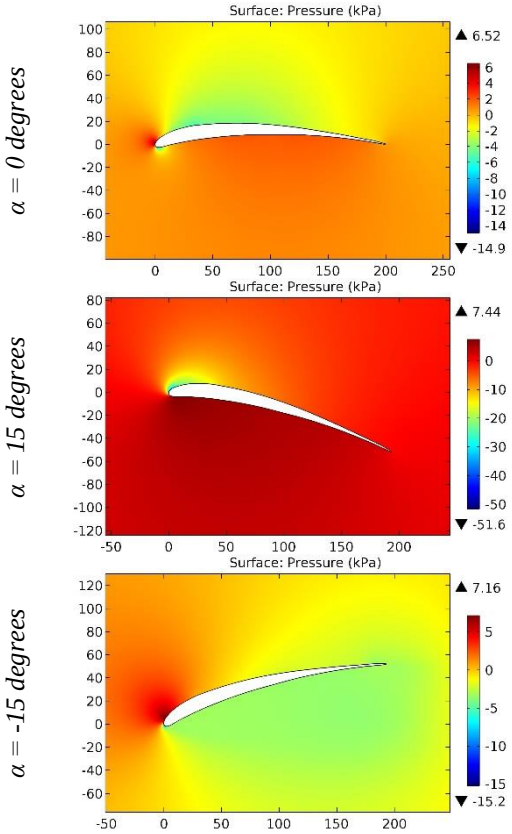


Figure 123. The pressure contours on the surfaces of the GOE 803 (HACKLINGER) airfoil.

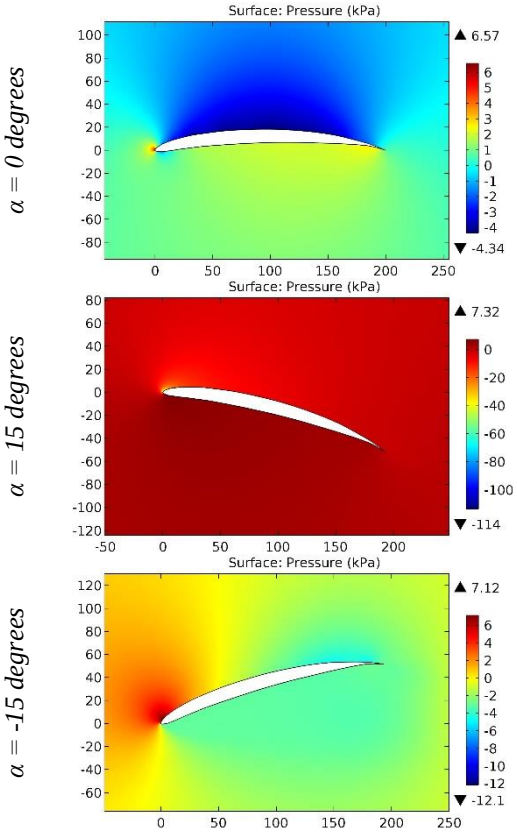


Figure 124. The pressure contours on the surfaces of the GOE 804 (EA 8) airfoil.

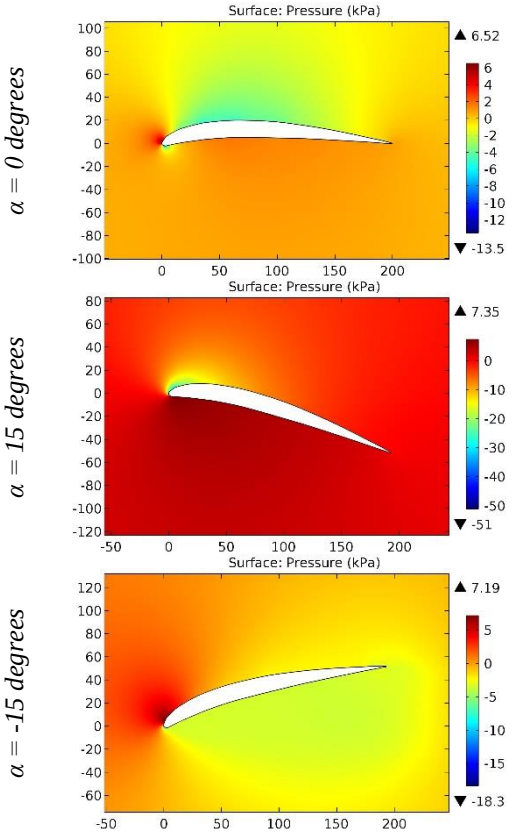


Figure 125. The pressure contours on the surfaces of the GOE 81 airfoil.

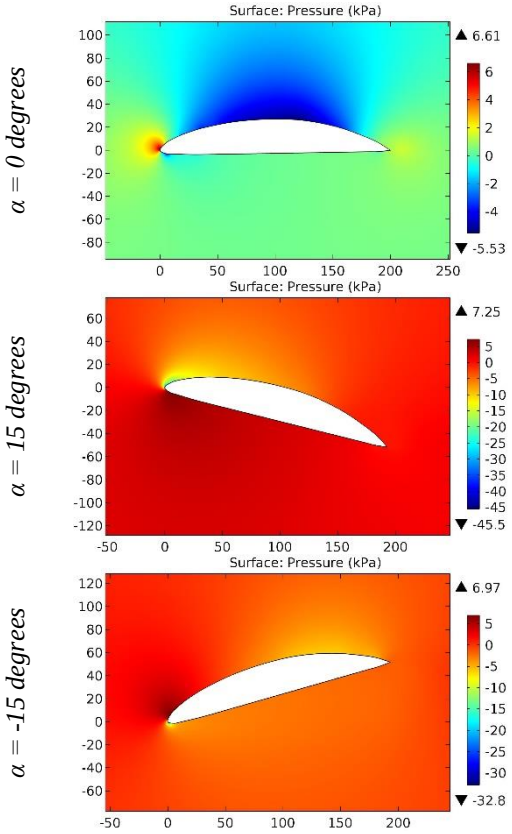


Figure 126. The pressure contours on the surfaces of the GOE 8K airfoil.

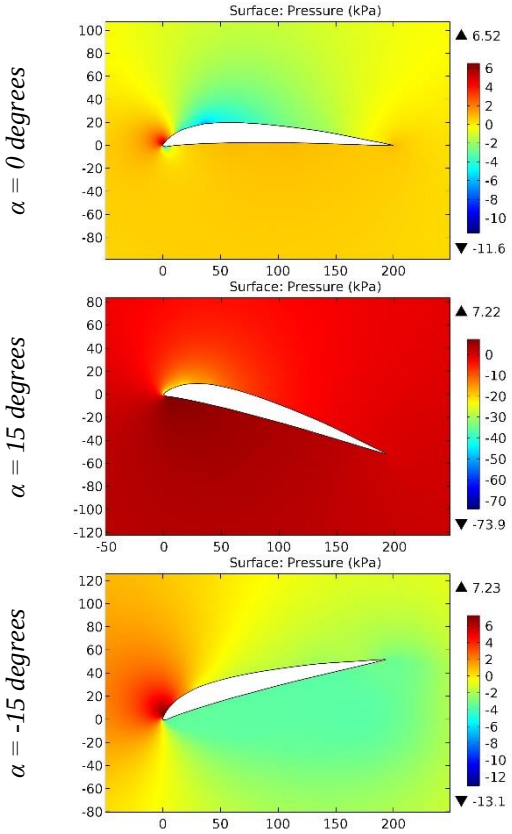


Figure 127. The pressure contours on the surfaces of the GOE 92 airfoil.

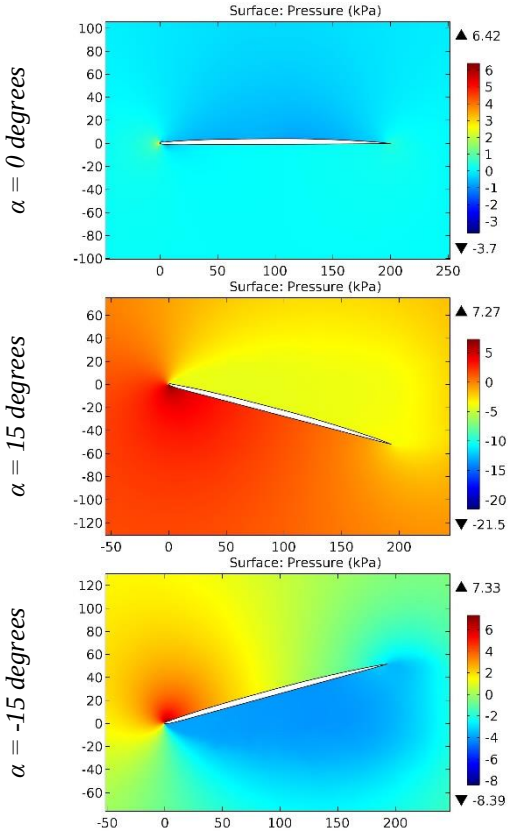


Figure 128. The pressure contours on the surfaces of the GOE 9K airfoil.

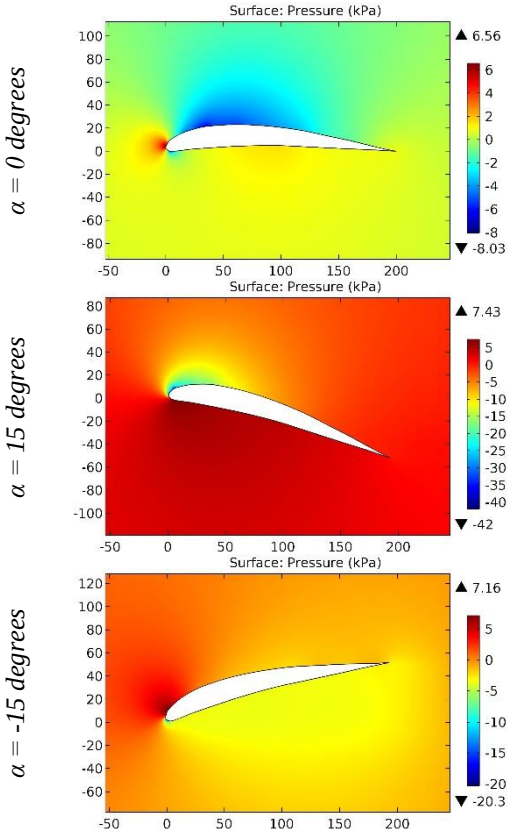


Figure 129. The pressure contours on the surfaces of the Goldberg G 5 airfoil.

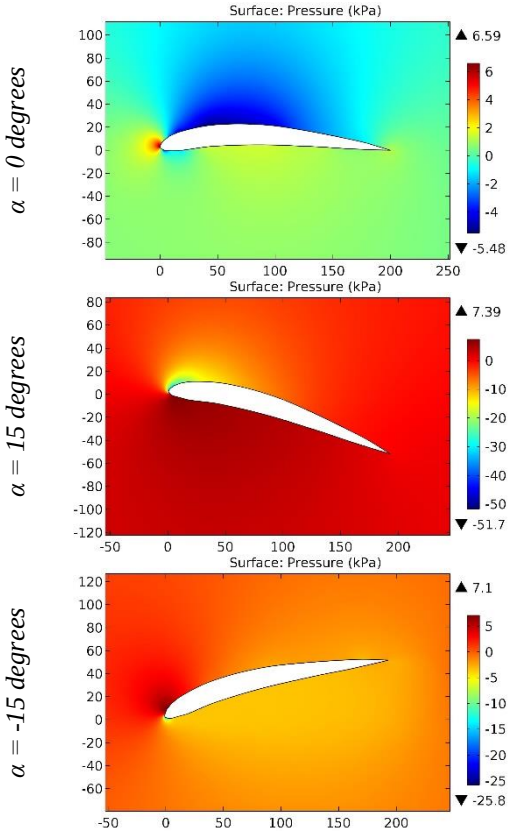


Figure 130. The pressure contours on the surfaces of the Goldberg Zipper airfoil.

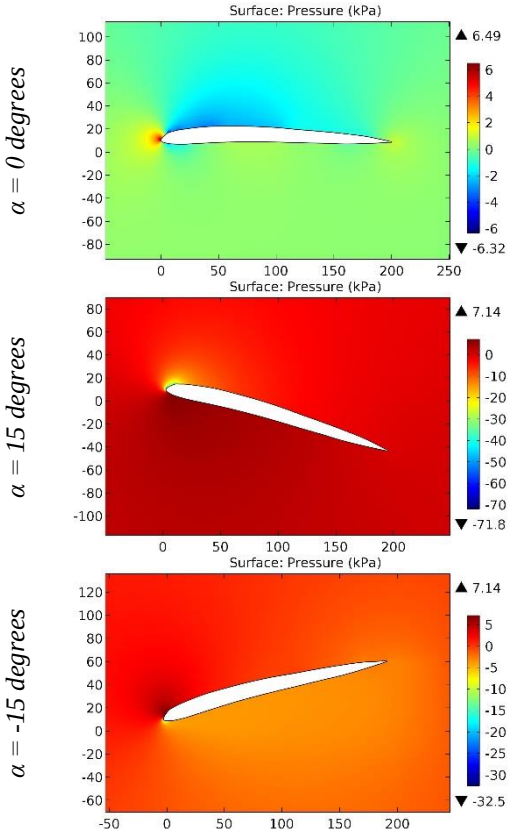


Figure 131. The pressure contours on the surfaces of the GOLDBRG6 airfoil.

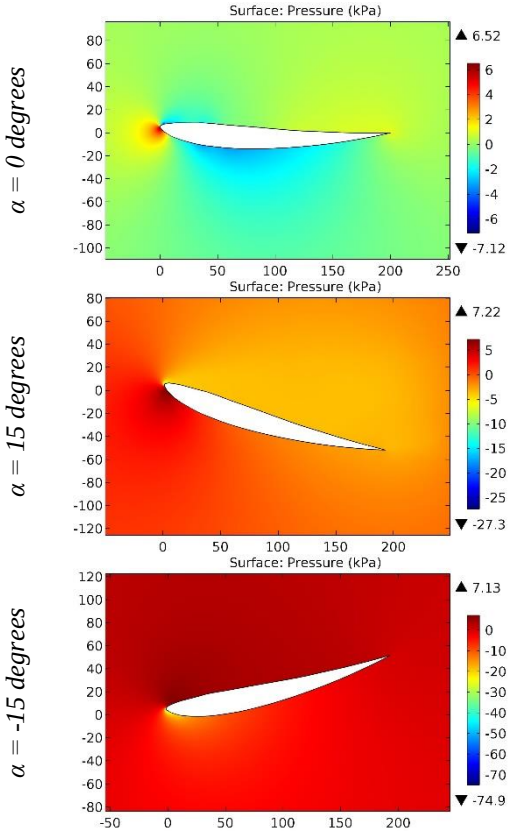


Figure 132. The pressure contours on the surfaces of the GOO602 airfoil.

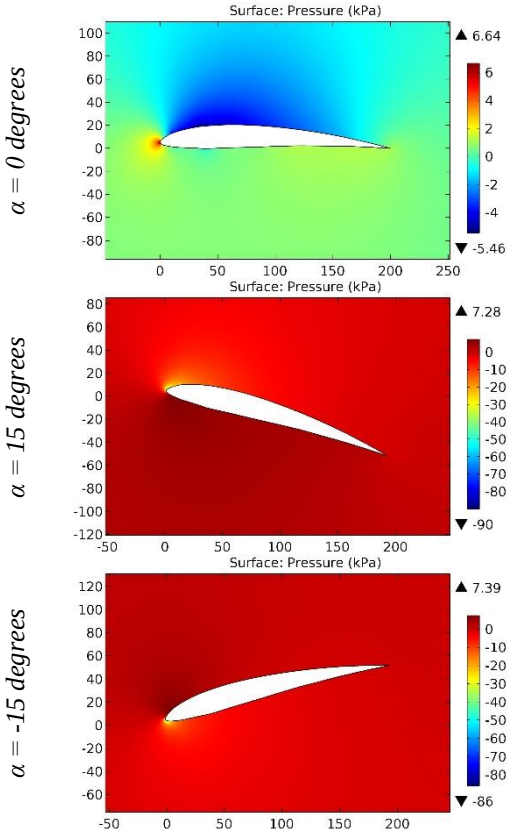


Figure 133. The pressure contours on the surfaces of the GOO620M airfoil.

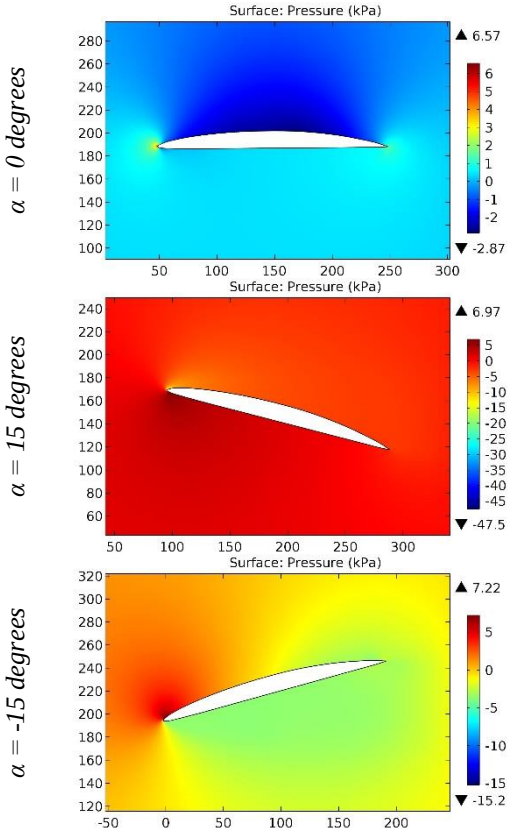


Figure 134. The pressure contours on the surfaces of the Gottingen 6K airfoil.

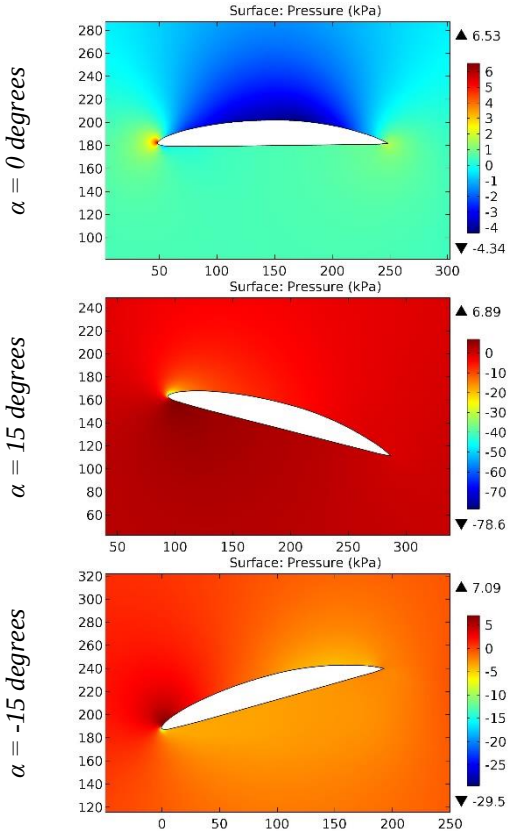


Figure 135. The pressure contours on the surfaces of the Gottingen 7K airfoil.

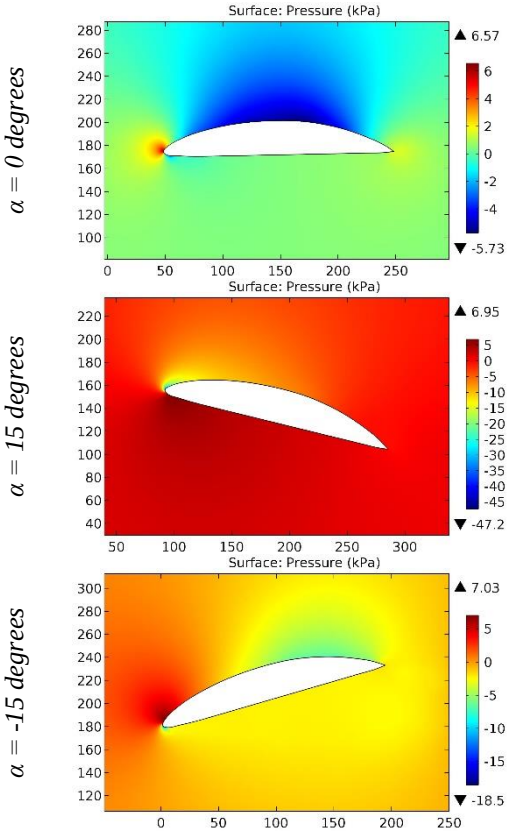


Figure 136. The pressure contours on the surfaces of the Gottingen 8K airfoil.

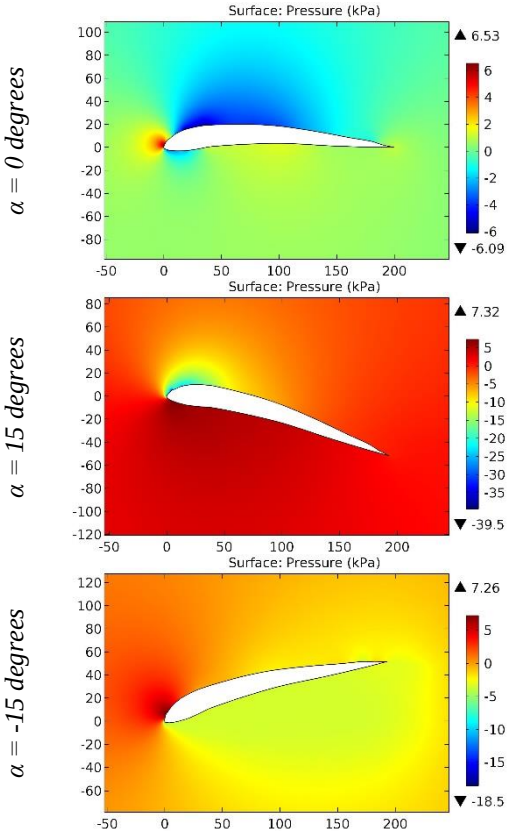


Figure 137. The pressure contours on the surfaces of the Grant G10 airfoil.

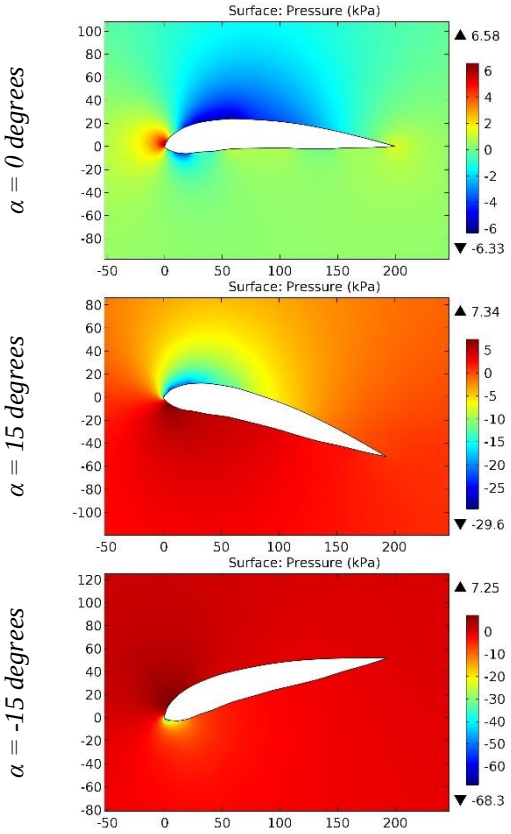


Figure 138. The pressure contours on the surfaces of the Grant X airfoil.

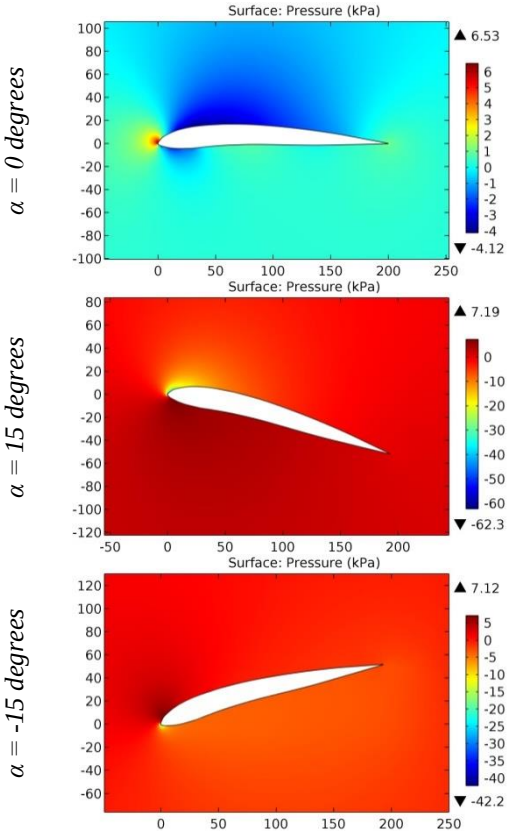


Figure 139. The pressure contours on the surfaces of the Grant X-10 airfoil.

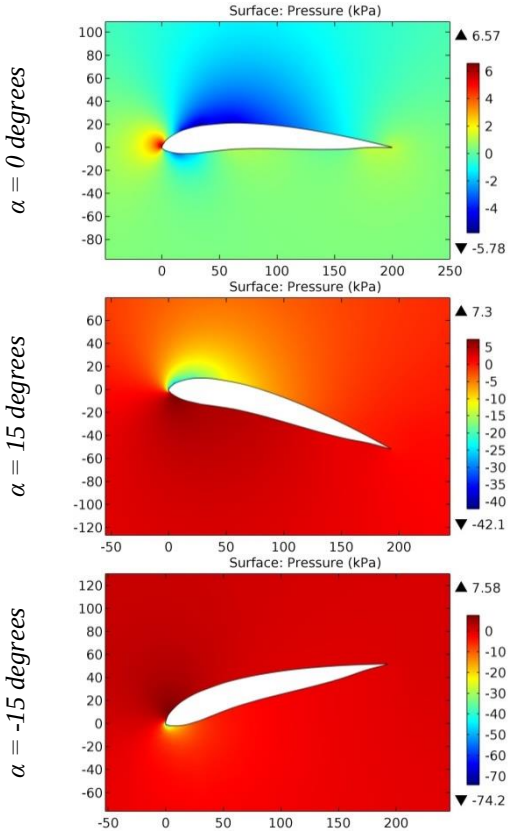


Figure 140. The pressure contours on the surfaces of the Grant X-8 airfoil.

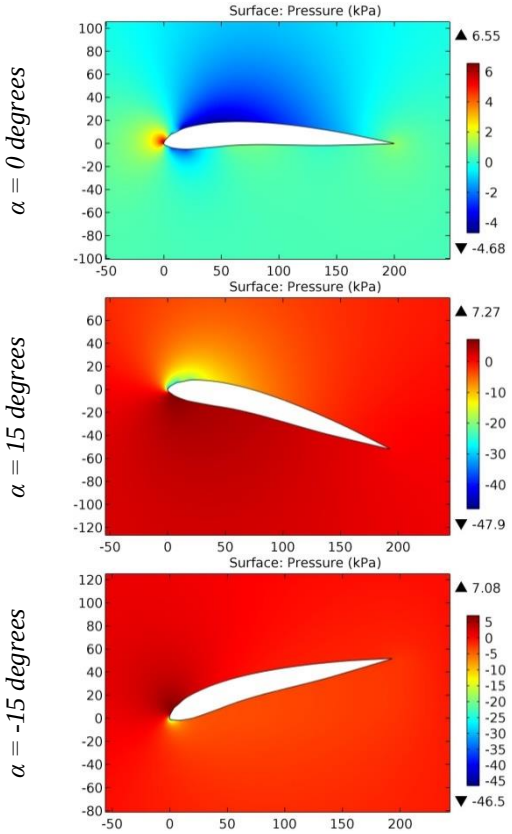


Figure 141. The pressure contours on the surfaces of the Grant X-9 airfoil.

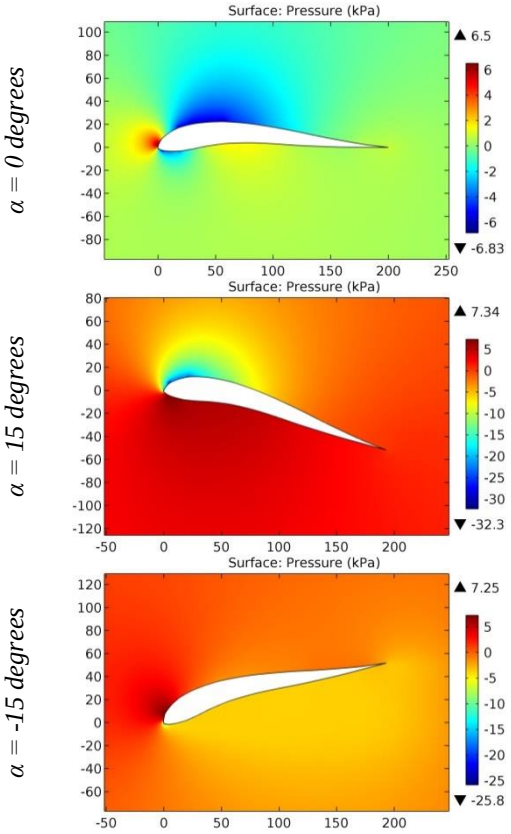


Figure 142. The pressure contours on the surfaces of the GRANTG9 airfoil.

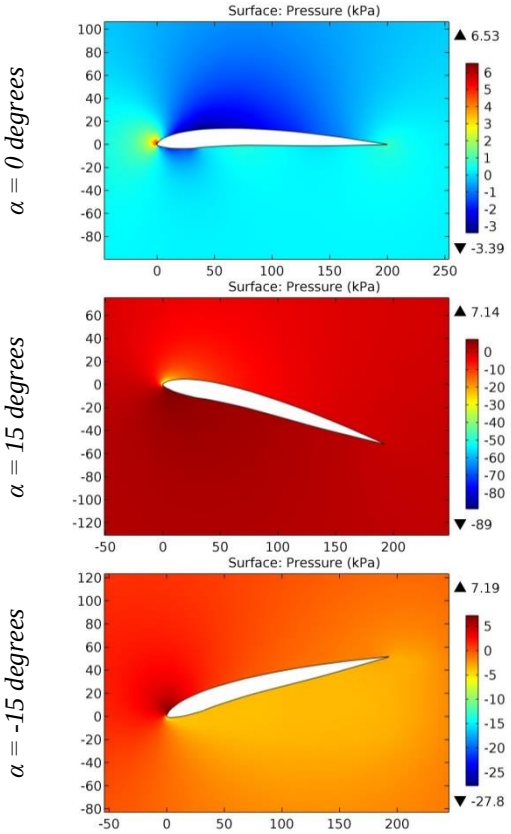


Figure 143. The pressure contours on the surfaces of the GRANTX12 airfoil.

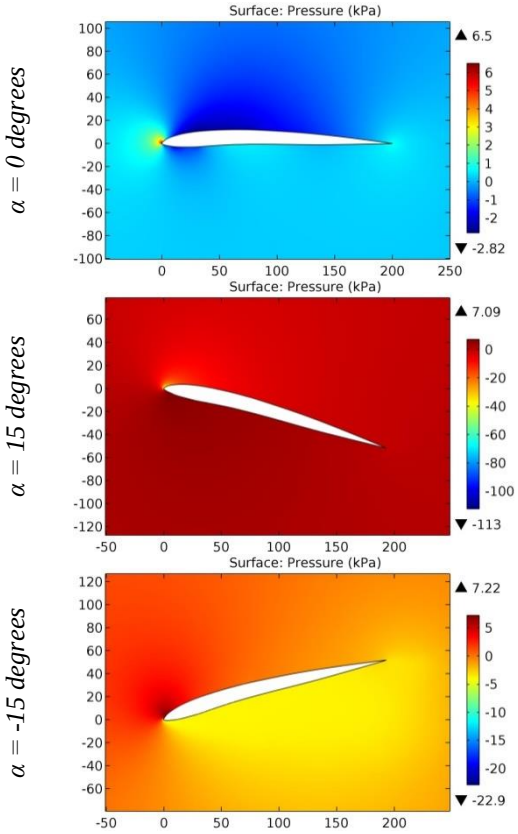


Figure 144. The pressure contours on the surfaces of the GRANTX14 airfoil.

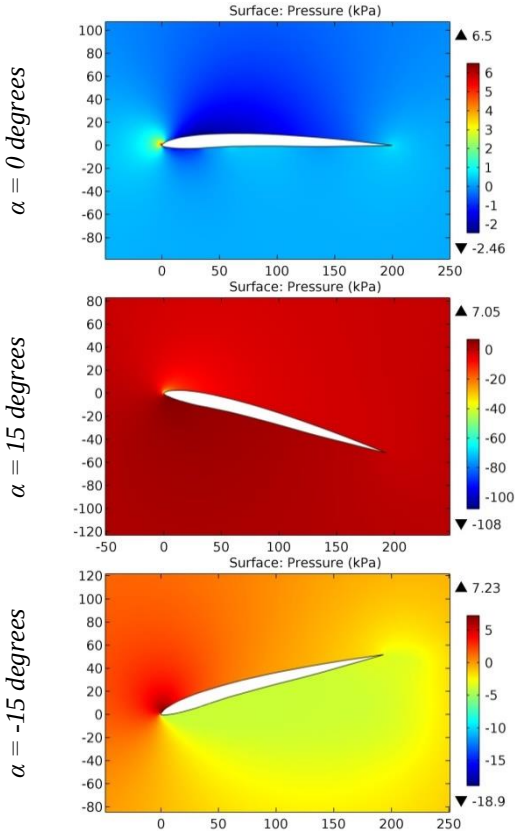


Figure 145. The pressure contours on the surfaces of the GRANTX16 airfoil.

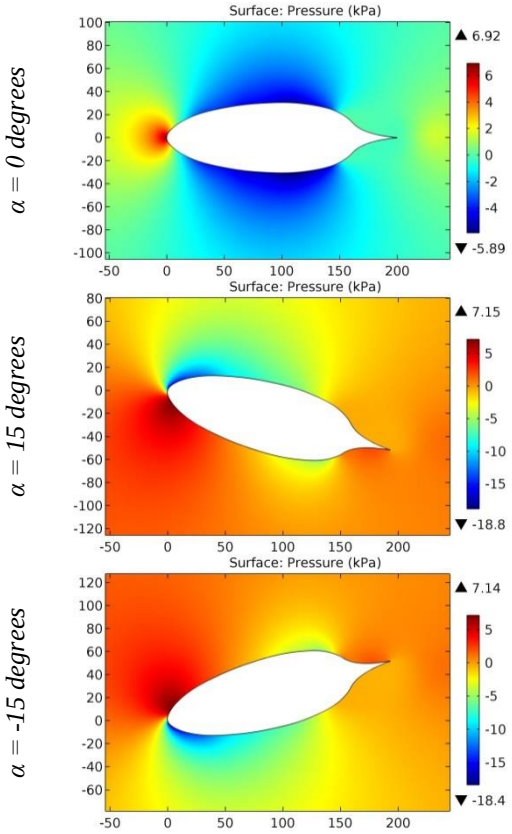


Figure 146. The pressure contours on the surfaces of the Griffith 30% thick symmetrical suction airfoil.

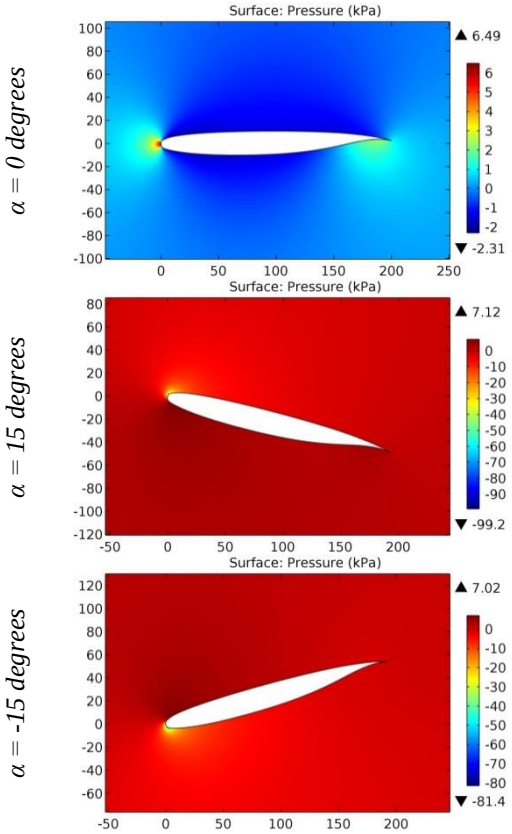


Figure 147. The pressure contours on the surfaces of the GRUMMAN K-2 airfoil.

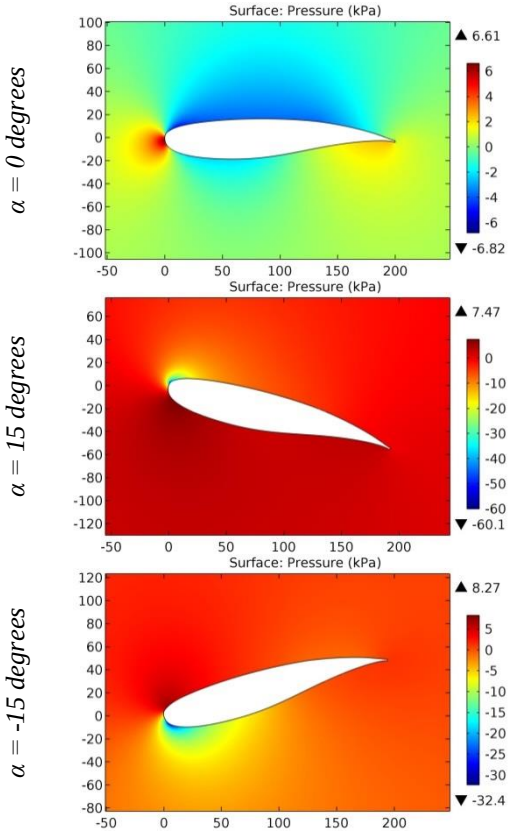


Figure 148. The pressure contours on the surfaces of the GRUMMAN K-3 airfoil.

The geometric shape of the GOE 531 airfoil makes it possible to reduce the drag on the leading edge during maneuvers compared to the horizontal flight of the airplane.

Comparing the GOO602 and GOO602M airfoils, it can be noted that in the first case, the drag is less due to the smoothed convex bottom surface.

The groove on the bottom surface of the GOE 802 A and GOE 802 B airfoils slightly reduces pressure on the surfaces, compared to the GOE 802 airfoil, which is produced without the groove.

The GOE 5K and GOE 9K supersonic airfoils at the negative and zero angles of attack ensure the formation of negative pressures of the small values on the surfaces.

The maximum increase in pressure on the leading edge occurs at the angle of attack of 15 degrees for the following airfoils: GOE 529, GOE 531, GOE 532, GOE 54, GOE 55, GOE 559, GOE 561, GOE 562, GOE 564, GOE 565, GOE 566, GOE 57, GOE 571, GOE 572, GOE 573, GOE 574, GOE 585, GOE 587, GOE 590, GOE 591, GOE 592, GOE 595, GOE 596, GOE 5K, GOE 602, GOE 602 MOD, GOE 610 B, GOE 610-B MOD, GOE 611, GOE 613, GOE 622, GOE 63, GOE 630, GOE 670, GOE 673, GOE 682, GOE 6K, GOE 711, GOE 744, GOE 746, GOE 79 (PFALZ 11), GOE 795, GOE 795 smoothed, GOE 7K, GOE 801 (MVA 301), GOE 802, GOE 802 A, GOE 802 B, GOE 803 (HACKLINGER), GOE 804 (EA 8), GOE 81, GOE 8K, GOE 92, GOE 9K, Goldberg G 5, Goldberg Zipper, GOLDBRG6, GOO620M, Gottingen 6K, Gottingen 7K, Gottingen 8K, Grant G10, Grant X-10, Grant X-9, GRANTG9, GRANTX12, GRANTX14, GRANTX16, Griffith 30% thick symmetrical suction airfoil, GRUMMAN K-2 and GRUMMAN K-3. The maximum increase in pressure on the leading edge occurs at the angle of attack of -15 degrees for the other airfoils.

Conclusion

The convex-concave airfoils have the greater lift, since the difference between positive and negative pressures on the upper and lower surfaces is several times greater than that of the airfoils with the other geometric shapes in the cross section. On the other hand, the high drag on the leading edge is not create on these airfoils during flight of the airplane.

The GOE 804 (EA 8) airfoil has the distinctive aerodynamic characteristics. The pressures values during climb and descent of the airplane change by almost 10 times.

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Issue Article

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METHODS OF USING GAME ACTIVITY IN TEACHING A FOREIGN LANGUAGE IN UZBEK PRIMARY CLASSES

Abstract: *This article introduces the study of gaming technology in lessons in Uzbek junior classes. Because one of the main tasks of a teacher at an early stage of teaching children a foreign language is to make this subject more interesting and beloved. Particular attention is paid to the use of game technologies in foreign language lessons, in particular role-playing games, which is an important method for stimulating the motivation of educational and cognitive activity of schoolchildren. The characteristic features of the methodological structure of the role-playing game are highlighted and described.*

Key words: *role-playing game, game, game as a means of teaching a foreign language, the structure of the role-playing game, the methodology of practical use of the role-playing game.*

Language: *English*

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Introduction

At an early stage of teaching children, a foreign language, one of the main tasks of a teacher is to make this subject interesting and beloved. At primary school age, children are very emotional and mobile, their attention is characterized by involuntariness and instability. It is important to consider the psychological characteristics of children of this age in the learning process. As a rule, younger students pay attention to what causes their immediate interest. And the game, as you know, is the main activity of a child of preschool and primary school age. It serves as a kind of "common language" for all the guys. Using the game as one of the means of teaching a foreign language greatly facilitates the learning process, makes it closer and more accessible to children.

Gaming technologies are one of the unique forms of learning that allows you to make interesting and exciting not only the work of students at the creative and search level, but also everyday steps to learn English. The entertainment of the conditional world of the game makes the monotonous activity of memorizing, repeating, consolidating or assimilating information positively emotionally colored, and the emotionality of the game action activates all mental processes and functions of the child. Another positive side of the game is that it promotes the use of knowledge in a new situation, that is, the material assimilated by students goes through a kind of practice, brings variety and interest to the learning process.

For a child, the game provides an opportunity to imagine himself as an adult, copy the actions he has ever seen and thereby acquire certain skills that may be useful to him in the future. Children analyze certain situations in games, draw conclusions, predetermining their actions in similar situations in the future.

The entire organization of the pedagogical process should fully contribute to improving the effectiveness of learning, the formation and development of the cognitive process (interest) in students, stimulating creative activity and activity in children. It is very important that the child develops both intellectually and emotionally, so that he creatively approaches the performance of a particular task or exercise. How to properly organize the pedagogical learning process in order to fulfill all the listed tasks? How to ensure that the children of junior and middle classes were interesting and exciting in the classroom, so that the program material was absorbed easily and naturally? How to make the lesson fly by unnoticed for both students and teachers? How to ensure that students do not just mechanically memorize words after the teacher, and then immediately forget at home, but consciously memorize words or those other phenomena and then be able to analyze them?

The role of game in foreign language lessons is very important. If children are interested, if they memorize this or that material while playing, if they are involved in gaming activities, and at the same time interest in a foreign language increases, then the teacher's goal can be considered achieved. Thanks to the games, the quality and effectiveness of training increases, the strength and ease of assimilation of educational material. Naturally, it is necessary to take into account the age capabilities of students, their skills and abilities, to approach each student in a differentiated way, to take into account his psychological abilities and characteristics.

The teacher should not only be a sensitive, knowledgeable teacher, endowed with artistic data. Children in the lower grades are very direct. Otherwise, you will be exposed, and you will never be able to become that friend-teacher who is so valued in our time. The creation of a positive, emotional, relaxed atmosphere in the classroom, mutual understanding between the teacher, the creation of an easy game creative mood in a foreign language lesson in junior and middle grades is a guarantee of successful language acquisition.

On the other hand, this does not mean that the whole lesson should obey the game. But game moments, game five minutes should always take place.

The game in the lesson must meet certain requirements:

1. Be sure to be combined with the program material;
2. Solve at least one of three tasks: educational, pedagogical, developmental;
3. Do not distract from the educational process as a whole;
4. Not to be long in time (otherwise the teacher ceases to own the learning process);
5. Be accessible to students (considering their psychological characteristics, age capabilities and their interests);
6. Not to be burdensome for the teacher, not to require special equipment;
7. Activate the learning process;
8. To please students and teachers.

The game, whether it is role-playing, plot-role-playing or some other, with proper and competent use, strengthens the motivation of learning a foreign language, arouses students' interest in the language and the country of the language being studied, improves the quality of language acquisition. It can be said that the game as a technique based on a combination of certain knowledge, skills, skills, types of various activities, is effective in teaching children.

The structure of the game as an individual activity includes the following stages:

- goal;
- planning;
- implementation of the goal;

analysis of the results in which a person fully realizes himself as a subject.

Motivation of gaming activity is provided by its voluntary nature, choice opportunities and elements of competition, satisfaction of needs, self-affirmation, self-realization.

The structure of the game as a process includes:

- the roles assumed by the players;
- game actions as a means of implementing these roles;
- the real relationship between the players;
- the plot (content) is an area of reality that is conditionally reproduced in the game.

A game is a type of activity in situations aimed at recreating and assimilating social experience, in which self–management of behavior develops and improves.

Most games are distinguished by the following features:

free developmental activity undertaken only at the request of the child, for the pleasure of the activity process itself, and not only from the result (procedural pleasure);

emotional elation of activity, rivalry, competitiveness, competition ("emotional tension");

the presence of direct or indirect rules reflecting the content of the game, the logical and temporal sequence of its development.

It is quite difficult to determine the main function of the game. According to most researchers, games perform a training function in ontogenesis (in the same way as a safe way to master an action through playing among animals).

Researchers of childhood – M. Mead, de Moz note that the games of children of primitive cultures, as a rule, are an imitation of professional actions of adults.

A. N. Leontiev also adheres to this opinion. He notes that in the course of a child's activity there is a contradiction between the rapid development of his need to act with objects, on the one hand, and the development of operations that carry out this action, on the other. The child wants to drive a car himself, row a boat, but cannot carry out this action because he does not own and cannot master those operations that are required by the real subject conditions of this action, and this contradiction can be resolved in a child only in a single type of activity - in a game [13, 23].

L. S. Vygotsky in the twenties of the last century drew attention to the change in the content and dynamics of children's play. He stressed that the game is a reasonable and expedient, planned, socially coordinated, subordinated to known rules system of behavior or expenditure of energy. By this, she discovers her complete analogy with the labor expenditure of energy by an adult, the signs of which completely coincide with the signs of the game, with the exception of only the results. Thus, with all the objective difference that exists between game and work, which even allowed them to be considered polar opposites to each other, their psychological nature is completely the same. This indicates that game is a natural form of child labor, an inherent form of activity, preparation for a future life. The child is always playing, he is a creature playing, but his game makes a lot of sense. It exactly corresponds to his age and interests and includes such elements that lead to the development of the necessary skills and abilities [4, 38].

Polish researcher Stefan Schuman notes that game is a characteristic and peculiar form of activity of a child, thanks to which he learns and acquires experience. Schumann pointed to the fact that the game encourages the highest emotional experiences in the child and activates him in the deepest way. According to Schumann, the game can be perceived as a development process aimed in a peculiar way at the formation of observation, imagination, concepts and skills.

The game is so multifunctional, original, unique, its borders are so vast and transparent that it is probably simply impossible to give it any clear, concise definition. Many explanations of the game that science has at its disposal are inaccurate, incomplete, and sometimes simply incorrect.

Here are only some opinions of scientists on this problem. All points of view are diverse and contradictory. However, most researchers agree that in people's lives, the game performs the following important functions, the classification of which was given by A. S. Shmakov:

the function of socialization;

the function of interethnic communication;

the function of the child's self-realization in the game as a "polygon of human practice";

the communicative function of the game vividly illustrates the fact that the game is a communicative activity that allows the child to enter into the real context of the most complex human communications;

diagnostic;

therapeutic;

correction function;

entertainment.

The game by its nature is very close to real life situations, and sometimes it is inseparable from them. Thanks to the dichotomy – a fictional problem and real efforts to solve it – the game allows you to model the socio-cultural context, play different behaviors, correct and then play again. What is difficult or absolutely impossible to fix in life (cross-cultural conflict or cross-cultural shock) can be lost again and again in the game, developing strategies necessary to avoid this conflict.

The game is focused on group activity, which fully meets the requirements of modern methodology. It is also easily transformed into various forms of individual activity, giving each student the opportunity to try himself in a particular role and show individual abilities.

Due to its iconic nature, the game provides an almost unlimited opportunity to create fictional situations, problems, incidents, conflicts - everything that requires verbal and nonverbal activity and that is absolutely necessary for the development of intercultural communication skills.

The communicative nature of the game also provides opportunities for the development of communication skills. The need to comment on one's own and others' actions, interact within the group, object, agree, express one's opinion serves as a basis for the development of speech skills and communication strategies, which is necessary for the initiation and maintenance of intercultural dialogue [13, 47].

The use of the game contributes to the communicative and active nature of learning, the psychological orientation of lessons on the development of students' speech-thinking activity by means of the studied language, the optimization of students' intellectual activity in the educational process, the complexity of learning, its intensification and the development of group forms of work. It is obvious that the formation of speech skills and abilities should take place in conditions as close as possible to those that can occur in natural communication, and the learning process itself should be based on solving a system of communicative tasks through language material. The means of pedagogical management of educational activities are communicative tasks, with the help of which the teacher invites and engages students in creative activity [11, 56].

The superiority of the game over other means of learning is revealed in the fact that it is able to provide

not only individual, but also paired, group and collective forms of work in the classroom, which allows each student to make the most effective use of study time.

The game gives you the ability to navigate in real life situations, playing them repeatedly in your fictional world. Gives psychological stability. Relieves the level of anxiety. Develops an active attitude to life and purposefulness in fulfilling the set goal.

Based on this, we can say that the technology of game teaching methods is aimed at teaching students to be aware of the motives of their teaching, their behavior in the world and in life, that is, to form goals and programs of their own independent activity and to anticipate its immediate results.

The communicative approach to teaching foreign languages requires differentiation of knowledge of various language rules and the ability to effectively apply these rules in the communication process. The main concepts of this approach are represented by the following paradigm:

the main focus is on communicative competence;

the curriculum considers the interests of students;

responsibility for the learning process is assigned to both teachers and students;

authenticity of materials and solved problems of the real world;

eye contact during communication;

independence and cooperation in training;

setting for success.

As a result of the implementation of this approach, students' motivation and self-confidence are growing.

Activity tasks for communication-oriented teaching of foreign languages are based on game, imitation and free communication.

The following types of tasks are highlighted:

• communication games;

• communicative simulations in role-plays and problem-solving;

• free communication (socialisation).

The game is a communicative activity, although it is specific according to purely game rules. It introduces the child into the real context of the most complex human relationships. Children absolutely need a common dream, a common desire to be together, and the experience of collective experiences. Any gaming society is a collective that acts in relation to each player as an organizing and communicative principle, having a huge number of communicative connections. Children in the game converge quickly, and any participant integrates the experience gained from other players. By joining the team's game, the child assumes a number of moral obligations to partners. Communication should also be considered as the main energy source of the game. In joint communicative games, there is an active increase in vital energy as a result of game interaction, empathy, competition. Many children's games are distinguished, first of all, by their collective nature; they carry a charge of communicative activity, communication that transmit collective social experience, traditions, values and ideals from generation to generation. In the game activity of children, there are absolutely real social relations that develop between players [9, 32].

There are 2 main types of games:

competitive – games in which players or teams compete, compete to be the first to reach the goal;

cooperative – games in which players and teams go together to a common goal.

The communicative game should be used on the language material that has been worked out in advance and brought to automatism. At an early stage of learning a foreign language, this condition is mandatory, otherwise the communicative game will be unbearable, and as a result, meaningless. Based on this, the three-part form of performing communicative-oriented tasks (three-phase frame-work) is now becoming increasingly widespread. Almost any task can be performed in three stages:

preparatory (pre-activity);

executive (while-activity);

final (post-activity) [11, 72].

The game is a diagnostic tool for the teacher, allowing him to determine the most difficult moments, the degree of assimilation of the material, and, therefore, take all measures to eliminate them.

At the initial stage of language learning, students work with great interest. This is due to the fact that when students start learning a language, they imagine that they will immediately speak it. But oral forms of work and a strenuous pace for 45 minutes tire students, their attention weakens, and by the end of the lesson (especially if this is the last lesson) they stop working, which leads to poor memorization of the language material studied in the lesson. In this case, games and various rhymes come to the rescue [2, 54].

The games have extensive learning capabilities. Many outstanding teachers rightly drew attention to the effectiveness of the use of games in the learning process, since the game manifests especially fully and sometimes unexpectedly the abilities of a person, and a child in particular.

Conclusion

As a result of the study, we come to the conclusion that:

- the use of game technologies in foreign language lessons, in particular role-playing games, is an important method for stimulating the motivation of educational and cognitive activity of schoolchildren;

- in this work, we have experimentally (based on the results of pedagogical practice) proved the methodological value of using role-playing games in

foreign language lessons, which consists in the fact that participation in the game forms a number of mental neoplasms in a child.

This is imagination and consciousness, which allow him to transfer the properties of some things to others; the formation of the nature of human relations, which attach a certain importance to this or that action of an individual. It has a meaningful orientation in his own experiences, the child seeks to generalize them. On the basis of all this, he can develop skills of cultural behavior, which allows him to be effectively involved in collective and individual activities.;

- methodological and methodological conclusions were confirmed in practical classes during the period of pedagogical practice. Thus, we have proved in practice the effectiveness of the use of gaming technologies in foreign language classes to stimulate the motivation of educational and cognitive activity of schoolchildren.

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Issue Article

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MULTICULTURALISM OF MODERN ENGLISH LITERATURE

Abstract*: Until the 1970s, it was believed that the term "English literature" meant, first of all, literature created in the area of the British Isles. The work of major writers who lived outside of England was either not studied or assimilated within the English tradition. The literature of the United States of America stood apart because it had its own history. However, American literature has been explored outside of North America quite sporadically, although many American writers have preferred to live in England and Europe.*

Key words*: English literature, American literature, traditions, creativity.*
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Introduction

Since the second half of the 20th century, the point of view on English-language literature began to gradually change. The attention of critics was attracted by Australian prose and literature of the Caribbean (West Indies), as well as the work of writers from African and Asian countries that gained independence. In a number of universities (Canada, Australia, South Africa) courses of lectures were given on African, Irish and Canadian literature. Books written by regional authors expanded the understanding of the cultural range of the “young literatures”. The plot of these works, their themes and style were based on extraordinary characteristics, not always accessible to the understanding of the European reader. In this case, the consumer of the latest literary production had to deal with such phenomena as the social images of the British in the perception of the inhabitants of the former colonies, American individualism, Nigerian tribalism, Indian mysticism, self-identification of the West Indians. Since writers outside of England tend to work within their own national literary tradition, it seems likely that "awareness of the essence of other English literatures may become part of our reading habit".

The problems of intercultural communication, communication between carriers of various cultural stereotypes in modern society are increasingly forcing researchers to think about issues related to translation as a cultural, linguistic and literary "transfer", and Western writers to increasingly talk about whether the language they "turned out to be able to master a truly global language based only on the scientific and military superiority of the West." These considerations are becoming more and more relevant every day, as they make it possible to somehow realize whether this language, along with the overwhelming flow of standardized slogans of the mass media, advertising and marketing, is capable of creating a common basis for interethnic communication, which will make translation the most important phenomenon of social landscape.

The globalist tendencies towards unification in the last decades of the last century were opposed by the position of cultural relativity emerging in modern cultural studies and ethnology, which defended the

diversity of cultures and their specific characteristics, even though it is quite difficult to talk about cultures in terms of an authentic, self-sufficient "whole". The so-called post-colonial discourse that developed after the collapse of the world colonial system replaced the concept of cultural relativity with the idea of cultural difference, thus embodying a paradigm of cultural contacts and clashes that underwent transformations, which seriously influenced cultural politics. The re-emerging, largely controversial, theories about the "clash of civilizations" (S. Huntington) declare that the axis of future international conflicts will run rather not along the national, but along the cultural "meridian" separating various religious, political and economic systems: "In the foreseeable future, no universal civilization is foreseen yet; rather, we will face a world of different civilizations, each of which will have to learn to coexist with its neighbors."

Such postulates pose a serious challenge to the humanities, whose traditional categories and concepts of "intercultural pollination", mainly Eurocentric, require revision. In this regard, in the debate on the problems of world literature, the idea that a huge variety of literatures and cultures can be seen as based on a multifaceted "archive" of texts is becoming less popular. This diversity must be shaken as a result of a serious collision with the explosive dynamism of the text itself, which spreads the energy of unification from its base in the central zones to the periphery of the global cultural space.

The need to create a space of "oscillation" between cultures outside the framework of nations, in which a new productivity of atonal consonances can be discovered, and the experience of border zones in all its inconsistency can be mastered, is on the agenda. Such an area should take the place of the synthesis of "multicultural symphonies". Based on this, "every effort in expanding the horizons of world literature will face cultural misunderstanding, but this moment can also play a stimulating role in terms of creativity."

The growing influence of national literatures in English becomes a reflection of such cultural and political phenomena as the collapse of the British Empire, the entry of new nations into the world culture, the weakening of ties within the countries of the British Commonwealth, the growing awareness of independence in former colonies, the reaction to US attempts to play a special role in the world . The English cultural tradition is no longer dominant outside the British Isles, and it is unable to support this or that elite subject to British influence. The destruction of the established idea of English in national literatures reflects the growing cultural fragmentation of the English-speaking world. The English language comes into conflict with the way of life, behavior and national traditions of those who speak it, and, moreover, those who write it. Writers, educators, scientists do not unquestioningly follow the patterns of speech, behavior, morality and beliefs that dominated minds in the past. The loss of the unity of literary culture entails the recognition that the acceptance of the pronounced qualities of diverse national literary traditions has become an urgent need.

It is important to note that the so-called "English studies" became relevant at a time when the Greek and Latin languages had already lost their unconditional role in the education and upbringing of a gentleman. Homer, Virgil, Cicero, within the framework of the European tradition, as sources of moral and intellectual education, gave way to Shakespeare, Donne, Pope, Dickens on the lists for compulsory reading and study. In the process, of course, the sense of solidarity inherent in the European worldview was lost, the palimpsest of human memory was destroyed, the historical vision was crushed, which was previously built on a more acute sense of the momentary, closeness to the spiritual world of beloved writers.

The literature of the early twentieth century can be seen as an echo of the classical tradition, which was formed by an instinctive attraction to the cultural heritage of the past. The transnational thinking of T. S. Eliot, E. Pound and D. Joyce became "part of the modern cosmopolitan style, but the writers managed to maintain a clear, timeless, permanent view of human nature, in which the past always serves as a tuning fork for existence in the present."

The embodiment of ideals in English poetic and prose works often came down to the themes of rural solitude, family values, patriarchal traditions associated with the family estate, and, as a contrast, the depravity of the urban environment. Very often, as, for example, in D. Austin's Mansfield Park or E. M. Forster's Howerds End, the intrigue of the work was associated with who would inherit the estate, and this, to one degree or another, led, in the end, to the issue of inheriting the best cultural tradition.

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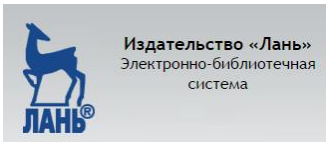

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