

Primjena numeričkih metoda
optimiranja i parametrizacije na
složenije modele



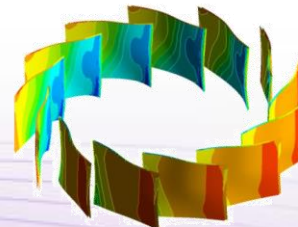
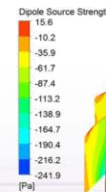
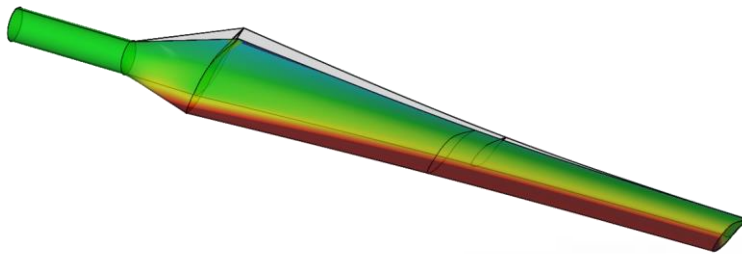
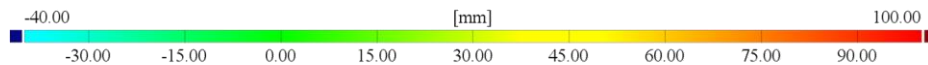
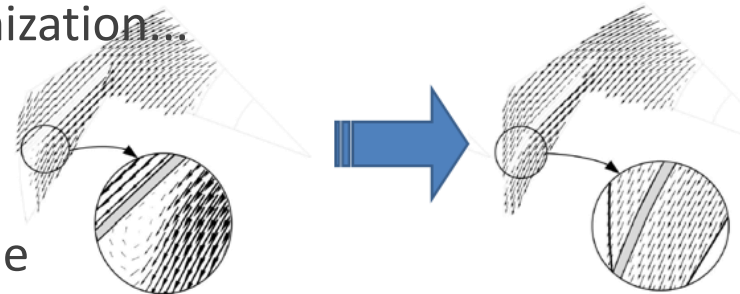
Ivo Marinić-Kragić

Split, Svibanj 2015.

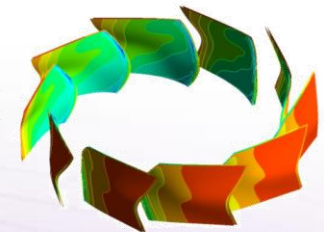
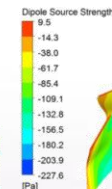
Pregled prezentacije

Prethodni radovi

- Multi-Regime vane shape optimization...
- 2D/3D optimiranje oblika
- Kriteriji vezani s bukom
- Optimiranje rotora vjetro turbine



a)

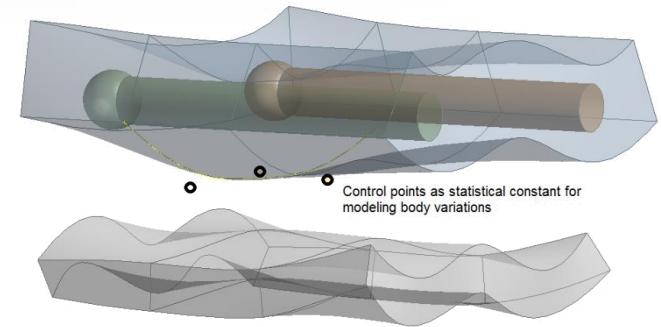


b)

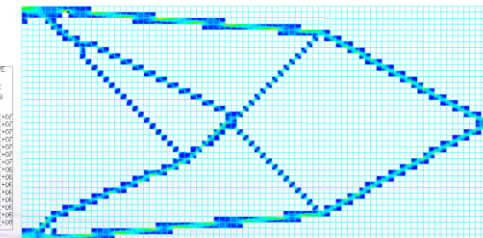
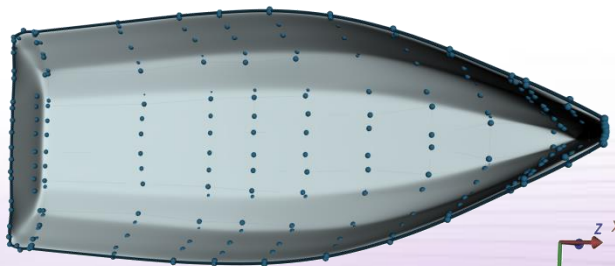
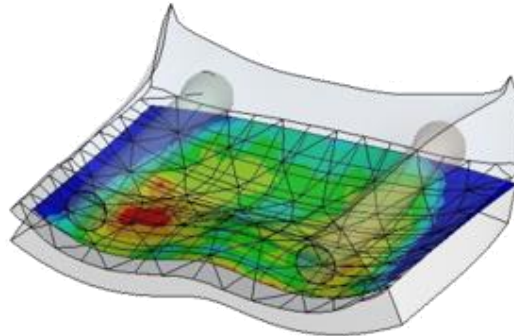
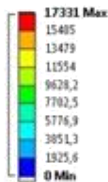
Pregled prezentacije

Trenutno

- Ergonimija/Komfor
- Topološka optimizacija
- Dinamička paremetrizacija



A: Static Structural
Pressure
Type: Pressure
Unit: Pa
Time: 1
24.4.2015, 14:44



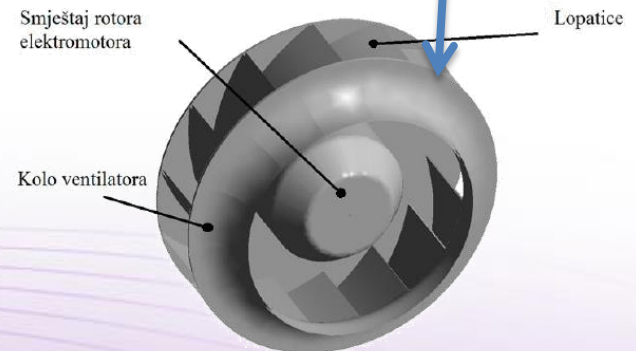
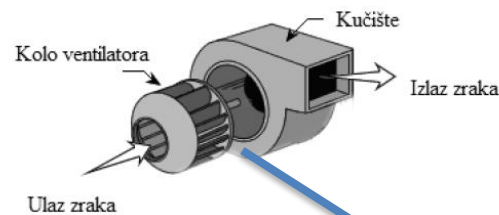
EFFECTIVE STRESS
POST CALC
TYPE 1,000

1,802E+07
1,333E+07
1,000E+07
1,485E+07
1,559E+07
1,202E+07
1,052E+07
1,179E+07
1,403E+07
1,153E+07
1,093E+07
1,495E+07
1,373E+07
1,000E+07

MAXIMUM
1,802E+07
EQ: 1, EL: 1106, P1: 13 (1,491E+07)
MINIMUM
1,000E+07
EQ: 1, EL: 80, P1: 22 (1,000E+07)

VIŠE-REŽIMSKO OPTIMIRANJE OBLIKA LOPATICA VENTILATORA ZA MAKSIMALNU EFIKASNOST PRETVORBE ENERGIJE KORISTEĆI CFD, 3D OPTIČKO SKENIRANJE I PARAMETRIZACIJU

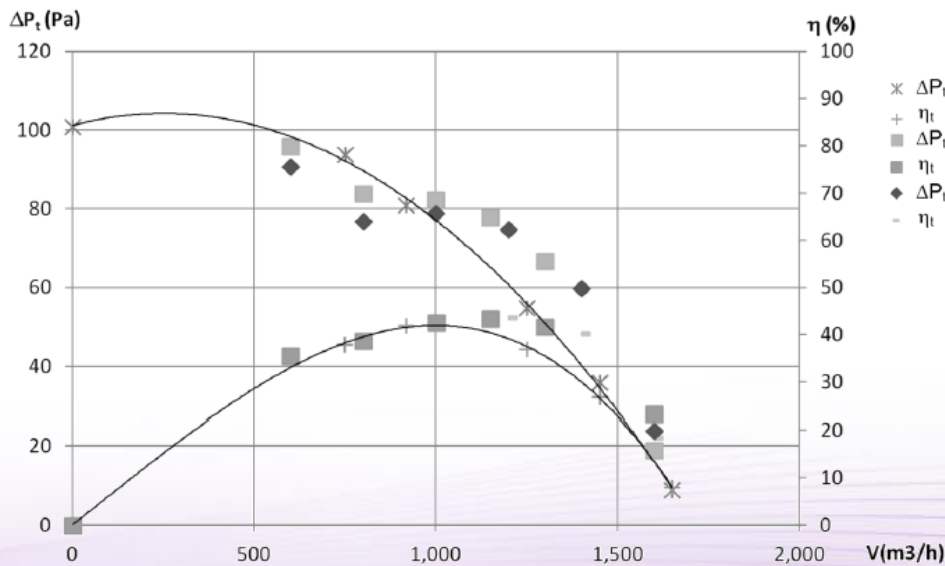
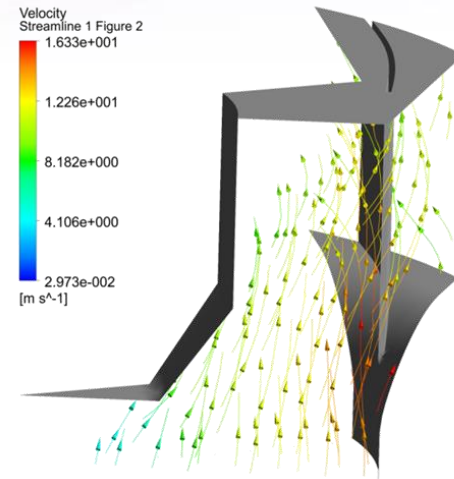
- Mala snaga
- Velika količina



- Mogućnost za smanjenje potrošnje energije

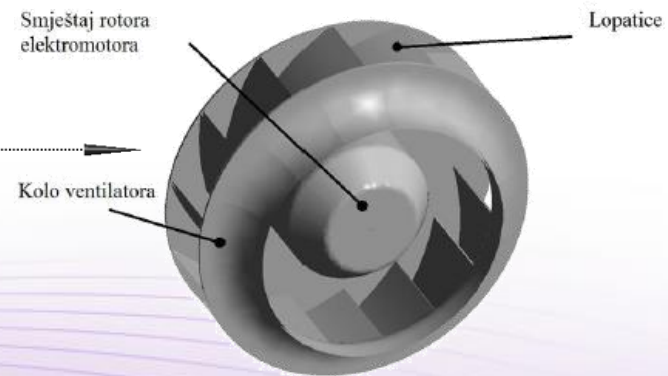
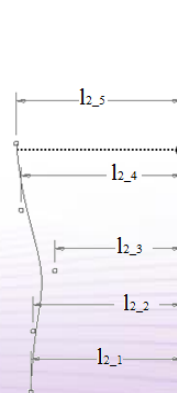
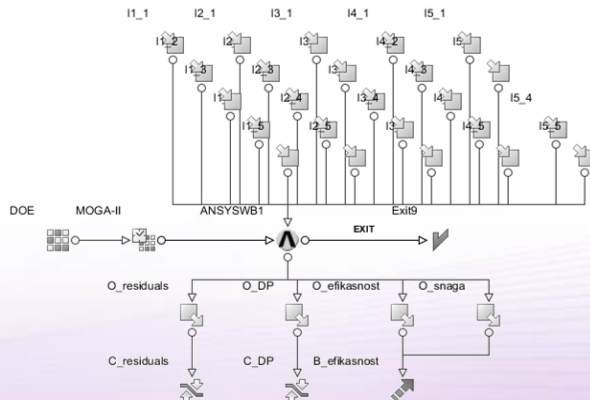
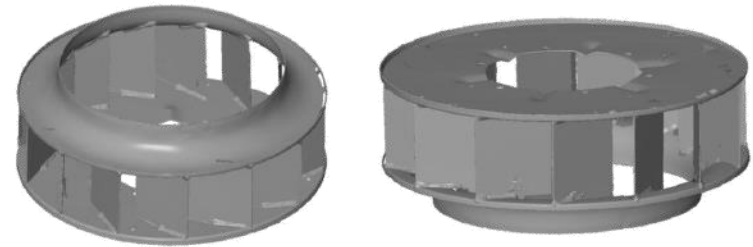
Optimiranje lopatice ventilatora

- CFD
- Eksperimentalna analiza ventilatora



Optimiranje lopatice ventilatora

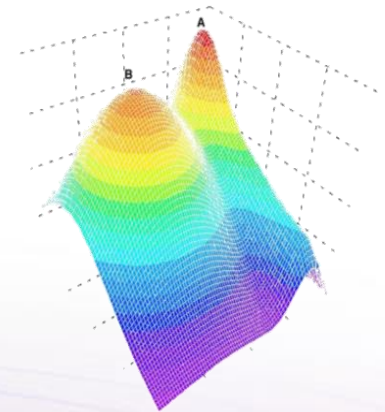
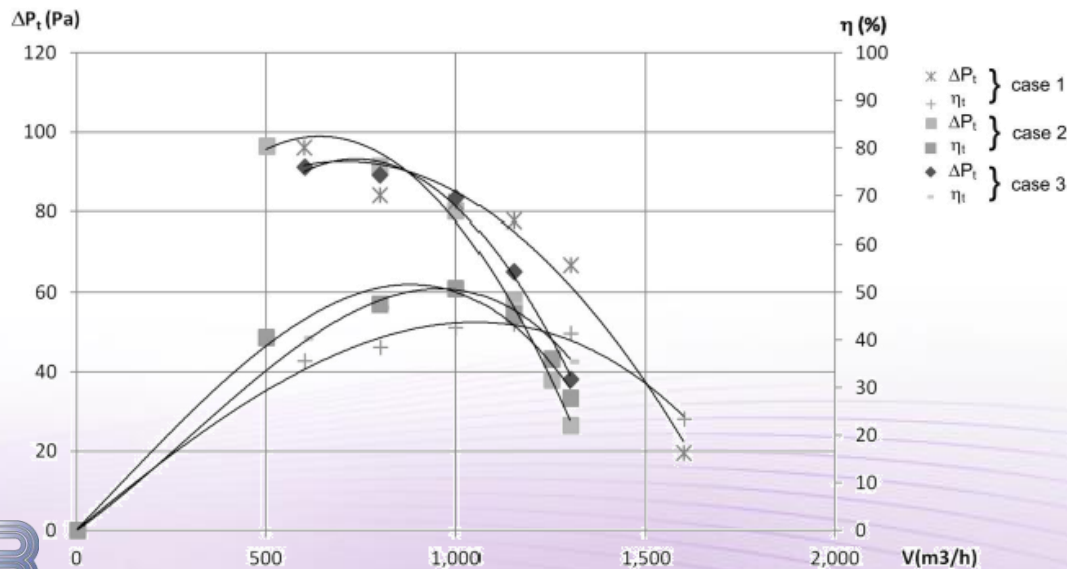
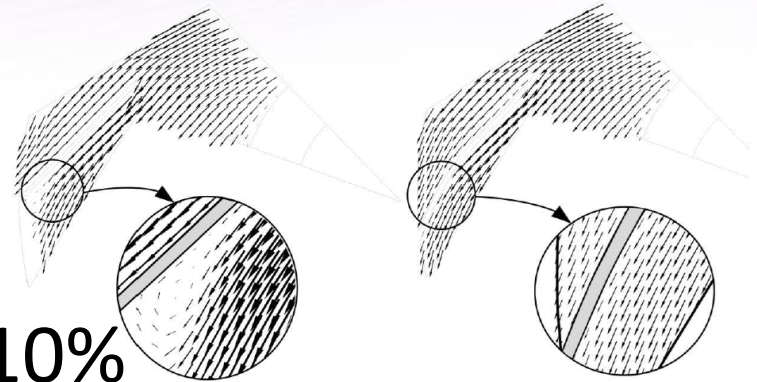
- 3D digitalizacija
- Parametrizacija
- Razvoj radnog toka



Optimiranje lopatice ventilatora

Rezultati

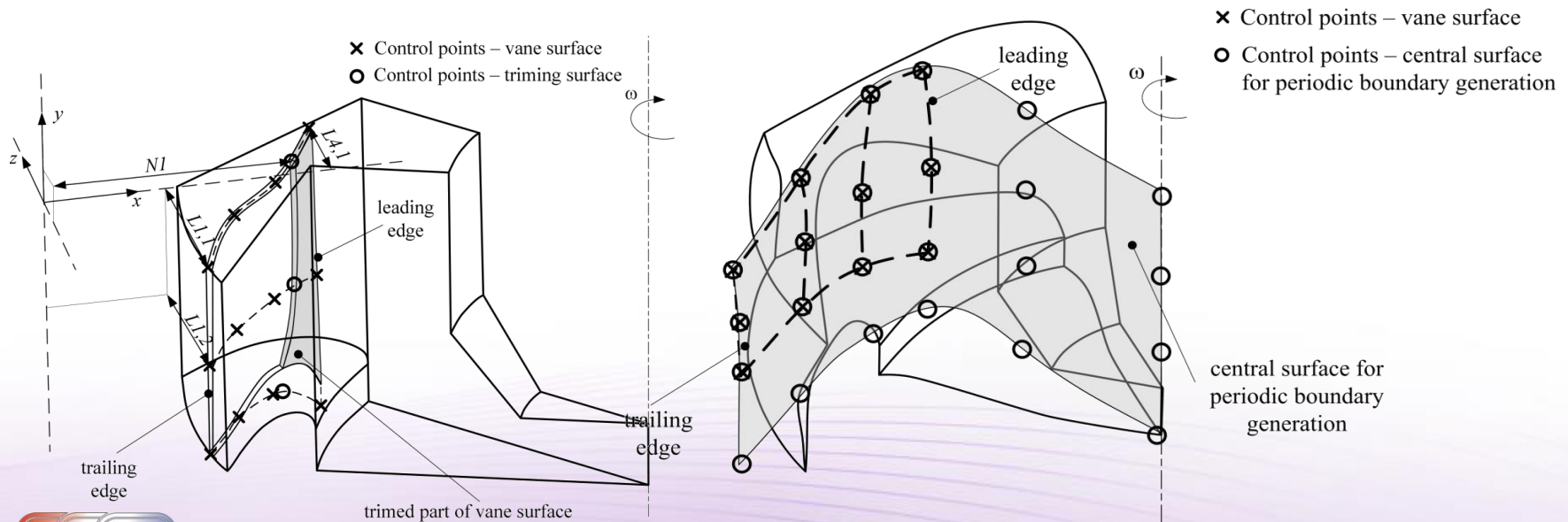
- SST <-> k-epsilon
- Porast efikasnosti - 5-10%
- Robusno i single-point



Optimiranje lopatice ventilatora

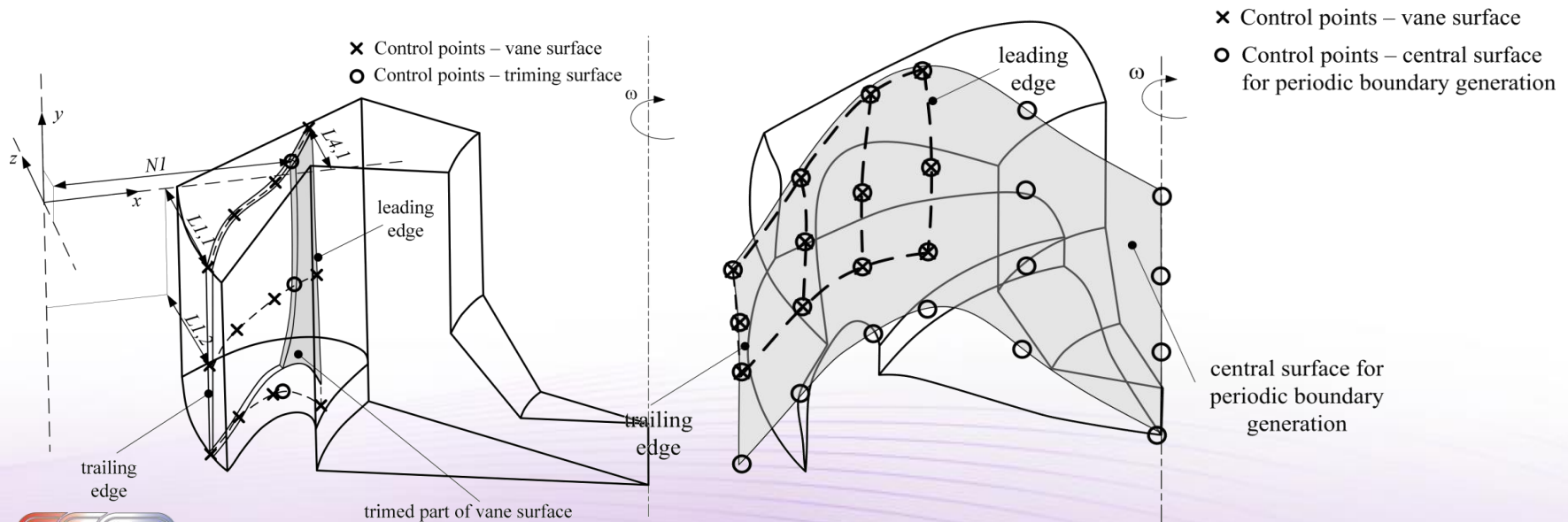
3D Parametrizacija

- Parametrizacija s fiksnom domenom
- Parametrizacija s varijabilnom domenom



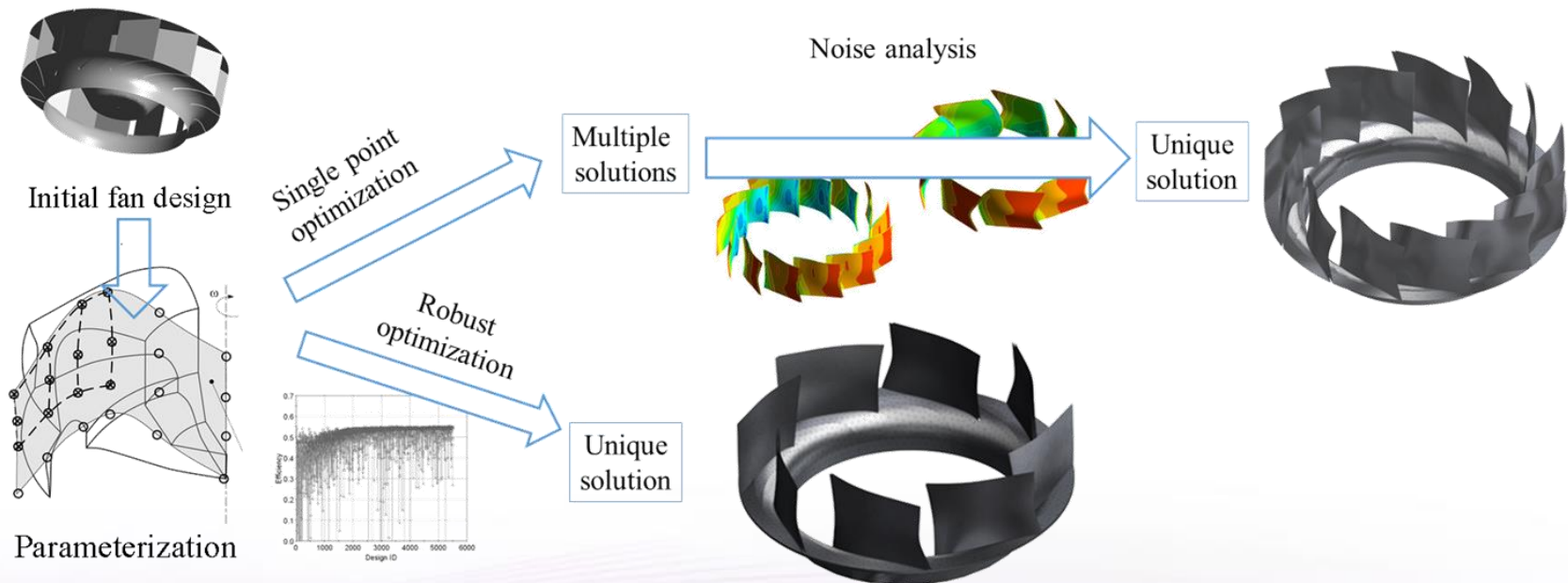
Optimiranje lopatice ventilatora

- 3D Parametrizacija
- Parametrizacija s fiksnom domenom
- Parametrizacija s varijabilnom domenom



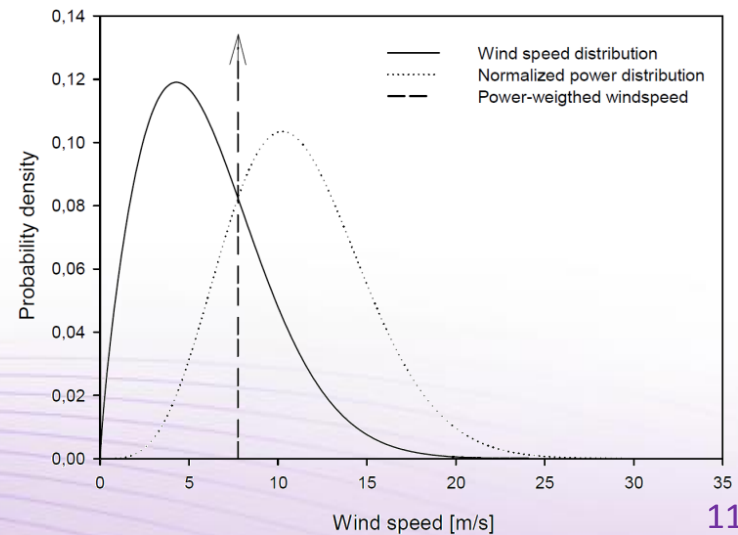
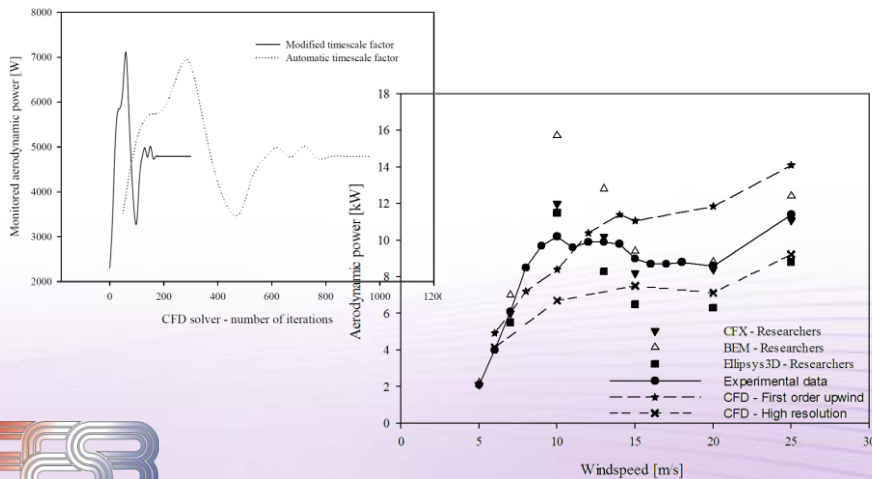
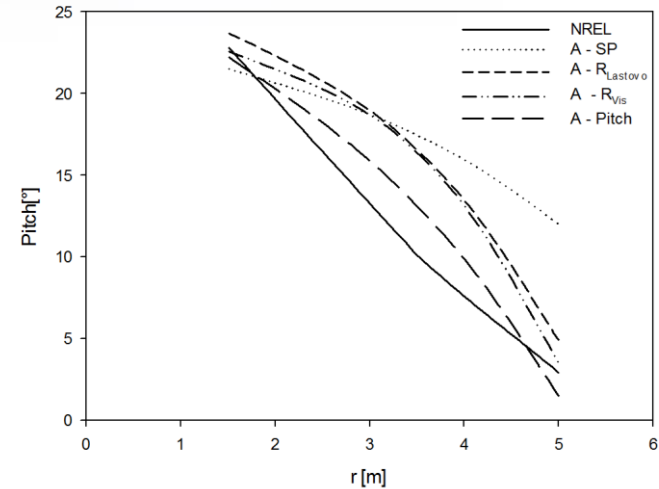
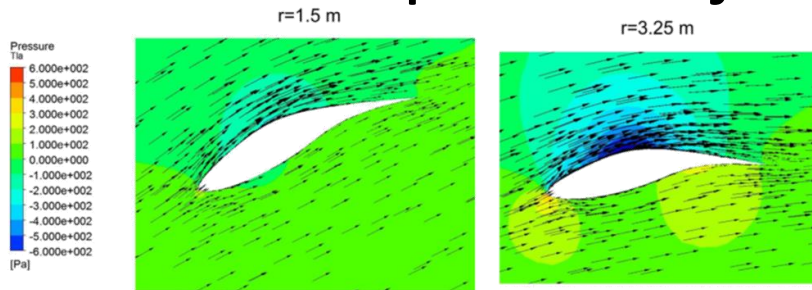
Optimiranje lopatice ventilatora

- Single point, Robusno, Analiza buke



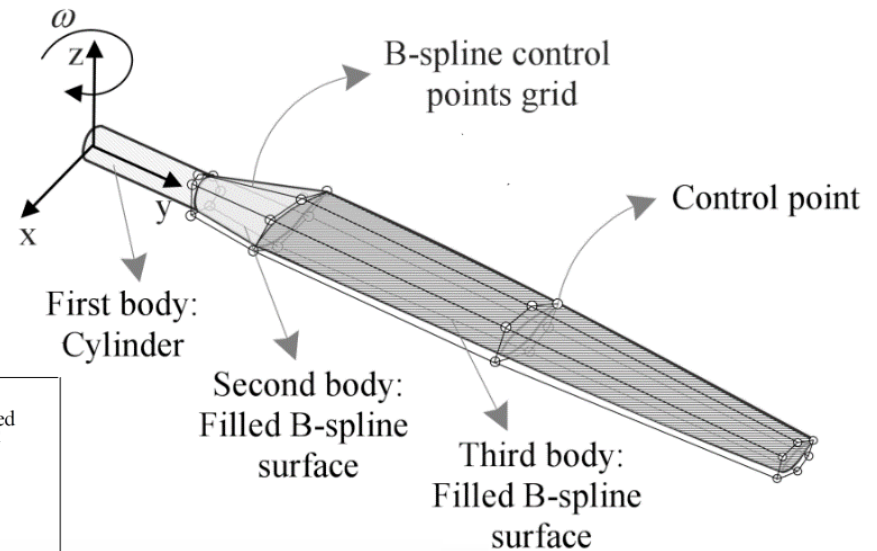
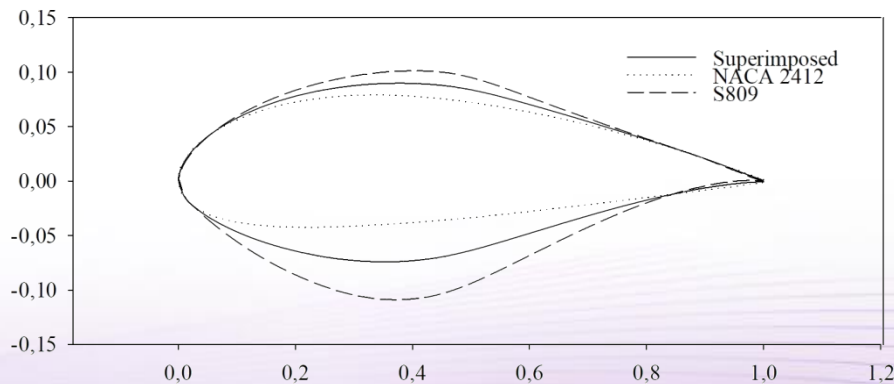
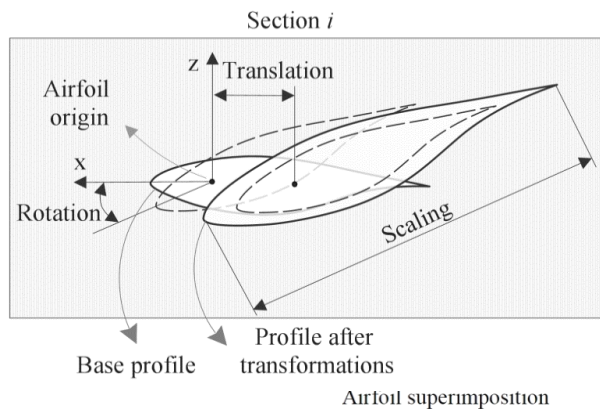
Optimiranje rotora vjetroturbine

- CFD
- Režimi optimizacije



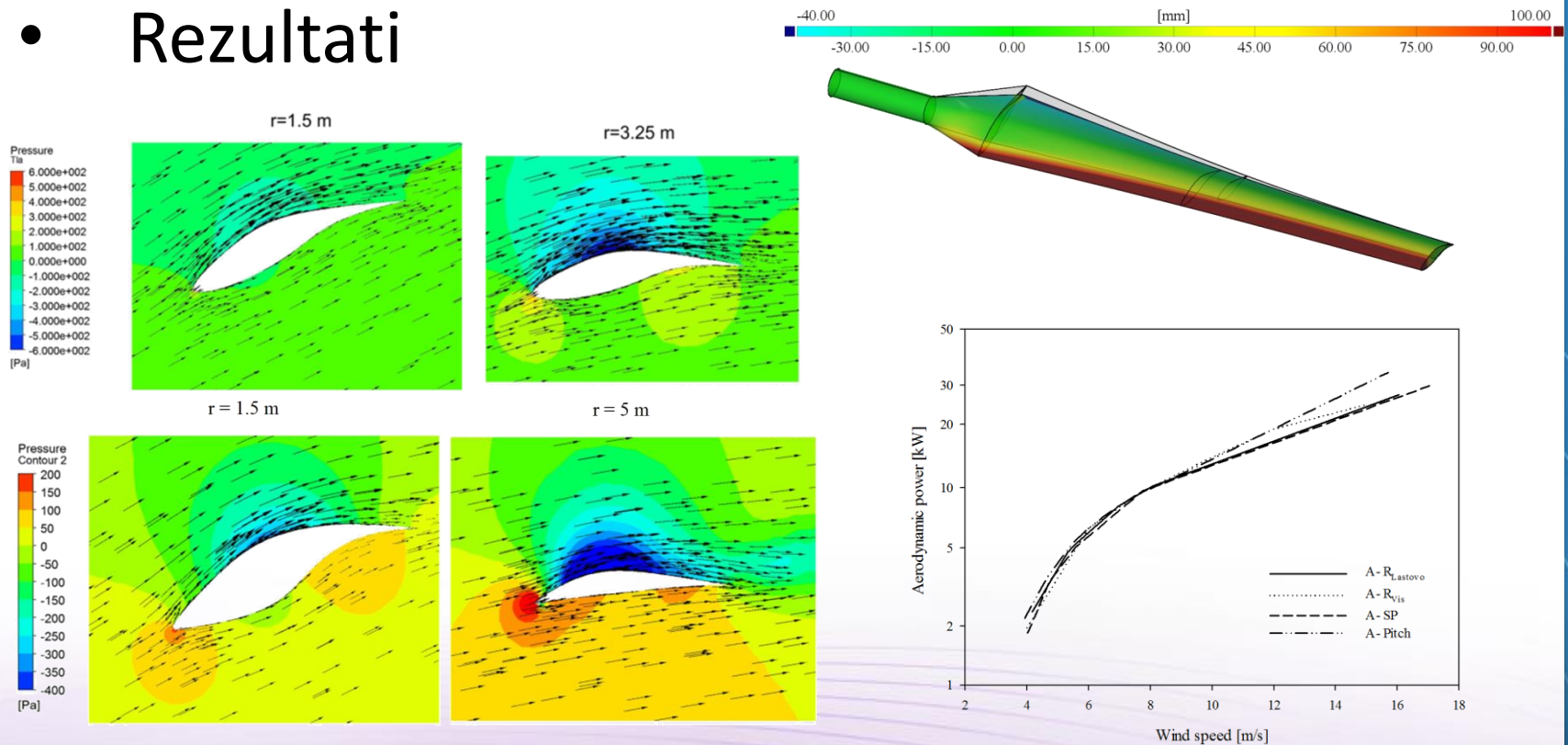
Optimiranje rotora vjetroturbine

- Varijante parametrizacije



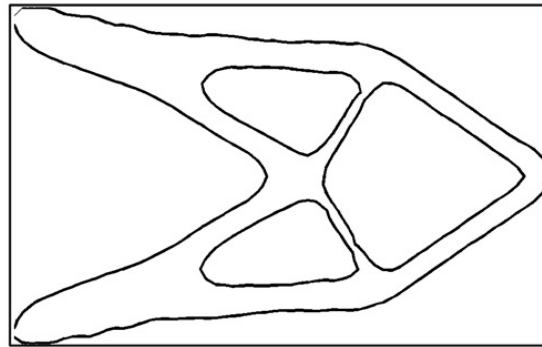
Optimiranje rotora vjetroturbine

- Režimi/varijante optimizacije
- Rezultati



Topologija

- Topologija povezanost elemenata sustava
- Topološkim optimiranjem mijenja se struktura domene
- Optimiranje topologije: dva nepoznata spregnuta polja (naprezanja i oblik-raspodjela materijala)
- Topološko optimiranje – multidisciplinarno

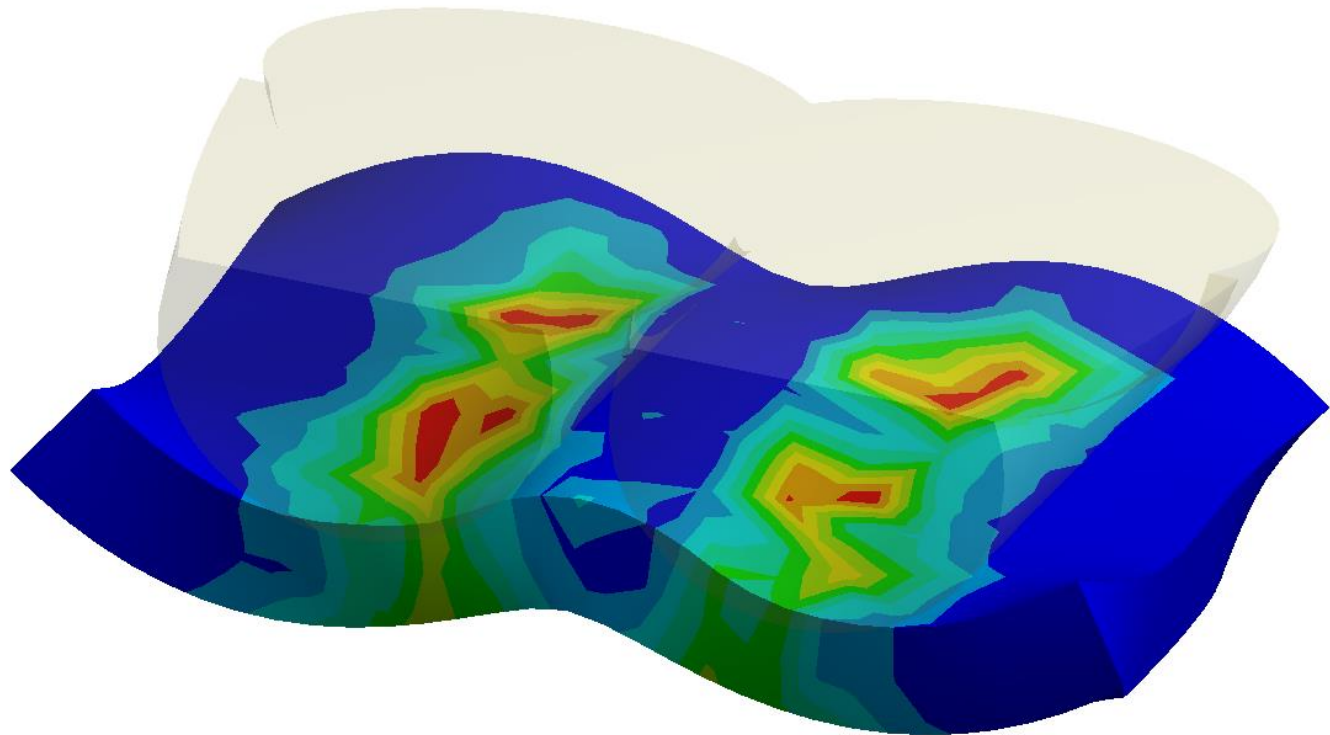
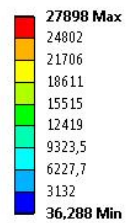


Komfor

- Optimalna raspodjela pritiska

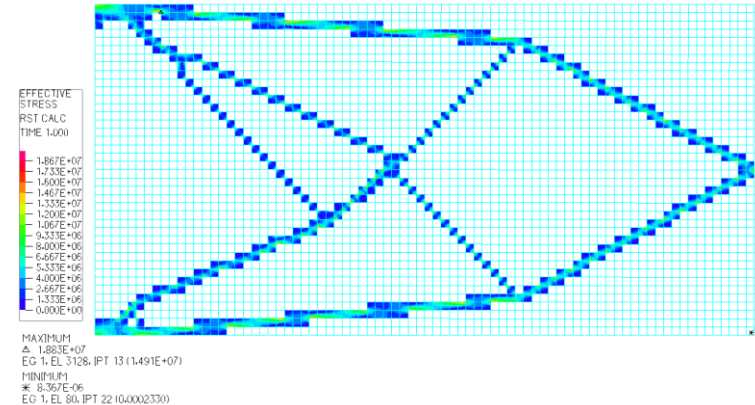
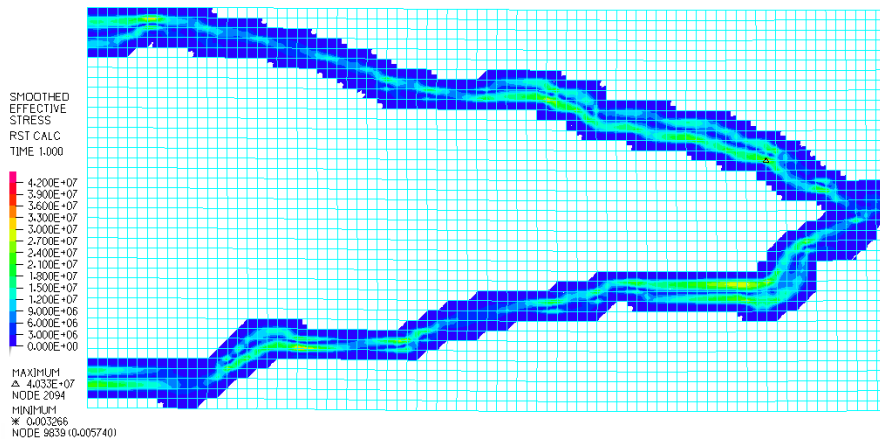
A: Static Structural

Equivalent Stress
Type: Equivalent (von-Mises) Stress
Unit: Pa
Time: 1
11.4.2014, 11:41



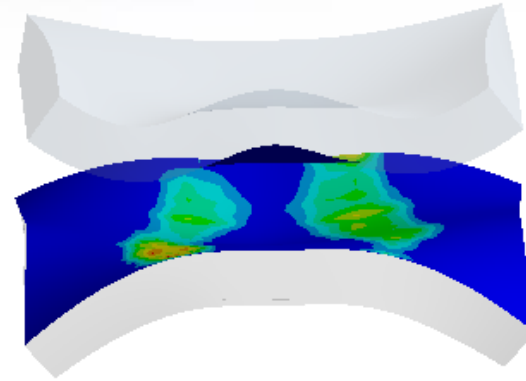
Topološko optimiranje

- Evolutionary structural optimization (ESO) i druge metode
- Level set

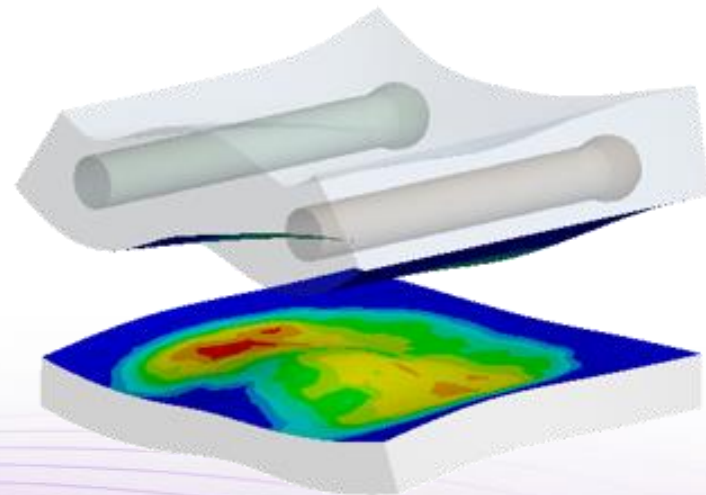
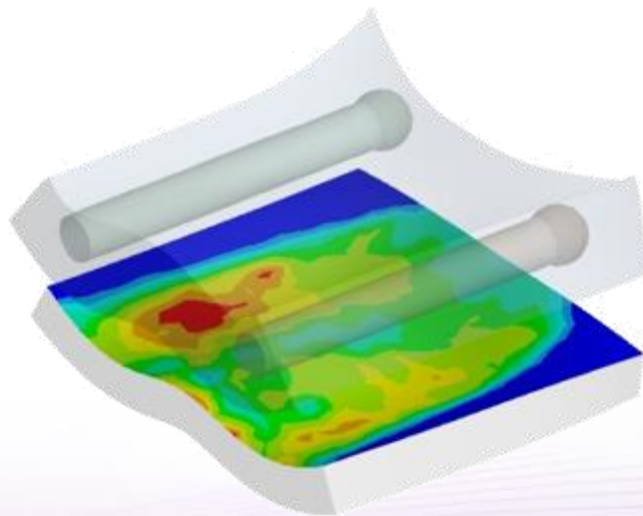
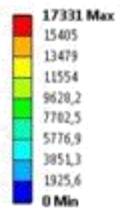


Ergonomija

- Mehanički modeli
- Rezultati
- Robusno/Single point



A: Static Structural
Pressure
Type: Pressure
Unit: Pa
Time: 1
24.4.2015. 14:44



Hvala na pažnji!

Pitanja???