OPTIMIZATION OF OBSTACLE WRAPPER SHAPE IN A PIPE BY GENETIC ALGORITHM

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This paper deals with finding of an ideal cover shape for barrier in a water flow. The shape was optimized by vorticity, Reynolds number and velocity of outlet boundary.

For creating of the pipe model and simulation was used COMSOL Multiphysics and for genetic computing was used Matlab with genetic toolbox. Generated model code with postprocessing variables create fitness function, which was used to optimize the geometry of barrier cover by genetic algorithm.

Genetic algorithms proved to be effective search tool for ideal barrier cover and give optimal solutions in acceptable time. This generalized method can be purposefully applied in hydrodynamics and aerodynamics.

The results showed that from the three selected parameters of postprocessing is the Reynolds criterion the best optimization condition of objective function.

Optimized network points were joined with line segments. It is possible to calculate the barrier with less resistance in condition of curves connection of optimized barrier points.

Keywords: genetic algorithm, Comsol, construction task optimization, global optimum
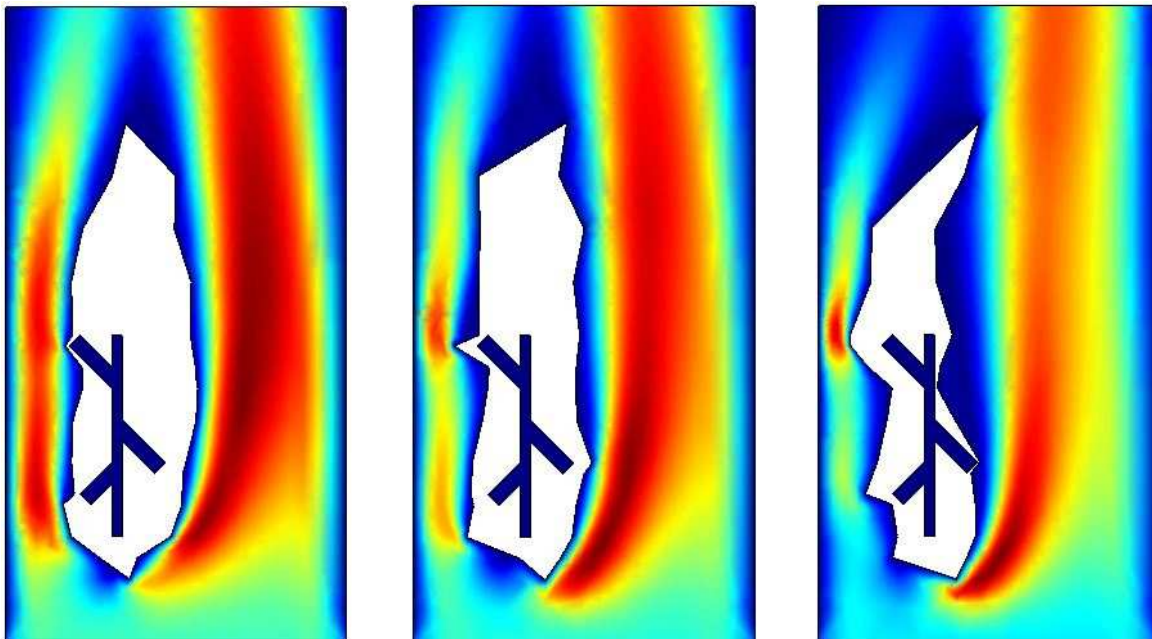
Fig. 1: Shape of ideal cover optimized by Reynolds number (left), vorticity (middle) and velocity of outlet boundary (right)