

TOPOLOGY OPTIMIZATION OF MECHANICAL STRUCTURES USING ARTIFICIAL IMMUNE SYSTEM

Summary – The paper deals with an application of the artificial immune system (AIS) and the finite element method to the optimization problems of 2-D, 3-D and the combination of 2-D and 3-D structures. The optimization method concerns the simultaneous optimization of topology, shape, and material. This approach is based on the mechanism discovered in biological immune systems. The main advantage of the AIS is the fact that this approach does not need any information about the gradient of the fitness function and gives a strong probability of finding the global optimum. The numerical examples demonstrate that the method based on evolutionary computation is an effective technique for solving computer aided optimal design.