

Soft computing in aerospace, mechanical and civil engineering: new methods and industrial applications.

Solving problems in the industry of aerospace, mechanical and civil engineering requires modeling the reality, generally using numerical simulations. Due to the high complexity of the environment, this task becomes very difficult and, in most of the cases, it is extremely expensive in terms of computational time and memory. For instance, to simulate the turbulent flow around a three-dimensional wing is necessary using models of at least 5-30 million grid points, solving complex differential equations in high-tech computers working in parallel using hundreds of processors for several weeks or even months. From these numerical simulations, large amount of information is stored, providing several Terabytes of specific data that need to be analyzed using sophisticated techniques. The first part of this session, will focus on new methods and new applications suitable to model the reality using a reduced number of computational resources. These methods could be used to reduce the computational cost in numerical simulations (soft computing) or to model the reality using low order models, with the aim at post-processing large amount of data and extract relevant information (reduced order models). The second part of the session will present soft computing in industrial applications related to aerospace, mechanical and civil engineering.

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