14th World Congress on Computational Mechanics (WCCM XIV)
8th European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS 2020)
July 19- 24, 2020, Paris, France

HIGH-PERFORMANCE AND INTELLIGENT COMPUTING FOR REAL WORLD'S ENERGY SYSTEMS

TRACK NUMBER (1200)

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Key words: HPC, FEM, FVM, Meshless Methods, Multiscale and Multiphysics Simulations, AI, Energy Systems.

ABSTRACT

Any source of energy that is superior in all aspects—cost, environmental impact, safety, and use of natural resources—does not exist. Therefore various types of energy systems including clean energy systems have been developed worldwide. To accelerate the development of such energy systems, advanced computer simulations are strongly expected to play a key role. However, core physics in such systems are very complex and tend to be multi-scale and multi-physics of fluid, thermal, solid, electromagnetics and so on. Therefore various types of simulation technology such as FEM, FDM, FVM, meshfree methods, particle methods and so on have been developed and applied. In addition, recently, petascale and exascale computing technology targets such computational mechanics simulations of various types of energy systems, such as carbon-free coal gasification plants, low-cost, long-lasting fuel cells, large-scale wind power plants farm floating along sea seashore, and nuclear fission / fusion power plants and others. In addition, recently various types AI technologies are going to open the door to a new era of computational mechanics. In this mini-symposium, focusing on high-performance and intelligent computing issues, we exchange ideas and information in order to advance computational mechanics for energy systems.