PARALLEL ALGORITHMS AND TECHNIQUES FOR THE SOLUTION OF LARGE-SCALE COUPLED PROBLEMS

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ABSTRACT

In the last decades, numerical methods have become very important in obtaining solutions to engineering problems that constantly increase in both, size and complexity, as they tend to address multi-physics real life configurations. To fully benefit form the power of supercomputers, these numerical methods must be permanently adapted and optimized. Nowadays, efficient and accurate methods exist for different large-scale problems in single-physical formulations and a great effort is being dedicated to achieve the same degree of efficiency and accuracy in multi-physics large scale coupled problems. Thus, the present thematic session is dedicated to algorithmic and software issues in the context of the parallel solution of large-scale multi-physics coupled problems. Different topics of interest (not limited to) to the present thematic session are: parallel multi-code coupling; development of numerical methods to multi-physics and multidisciplinary problems; the coupling of different solution strategies; coupling acceleration; coupling asynchronism; the joint use of different mathematical formulations and numerical methods, while maximizing individual advantages of each technique; visualization of large data sets; and the application of these concepts to challenging science and engineering problems.

The main purpose of this thematic session is to present and discuss up-to-date methodologies and engineering applications involving coupling problems and parallel computing techniques.