



## Lecture No. 81

**Czech Society for Mechanics and Institute of Thermomechanics, CAS**

invite you to a lecture and discussion  
within the lecture series **Institute of Thermomechanics Seminar**

# Application of the method of localized Lagrange multipliers to the partitioned solution of large-scale structural dynamic systems: The AFETI algorithm

given by

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In this talk, we will discuss about classical and new numerical techniques used for parallel/partitioned computations in structural mechanics and also multi-physics or coupled-field problems. In this field, methods based on classical Lagrange multipliers, like the two-level FETI-DP method, have been de facto the preferred parallel algorithms in solid and structural mechanics for decades. However, as we will see, classical Lagrange multipliers also present some limitations. The method of localized Lagrange multipliers (LLM) is a more general coupling technique, that introduces an explicit definition of the problem interface and brings some important advantages. Under this LLM framework, new partitioned algorithms like AFETI-C method are derived from variational principles. AFETI-C uses a combination of rigid-body modes and dominant substructural deformation modes in enforcing the interface force equilibrium equation as constraint conditions. In addition, a regularization of heterogeneities of partitioned systems is appended to AFETI-C that makes it competitive with FETI-DP. These methods, their derivation and their performance will be described, providing a full understanding of the potential of LLM in the solution of coupled problems.

**The lecture will be held on Monday, December 9, 2019 at 13:00 in the building of the Institute of Thermomechanics (lecture room B), Dolejškova 5, 182 00 Prague 8**