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Asymptotic analysis of dynamic fields in multi-structures

The talk deals with dynamic problems in singularly perturbed domains that include components of different limit dimensions. The analysis is based on the method of compound asymptotic expansions, described in the monographs [1], [2]. Three types of problems are addressed in the lecture: (a) An initial boundary value problem in a domain defined as a union of several thin bodies; (b) vibration of a layered structure with an imperfect interface which is represented by a thin and 'soft' layer; (c) a dynamic problem for a 1D-3D multi-structure defined as a union of a three-dimensional body and a set of thin cylinders. Examples of optimal design for a class of eigenvalue problems for multi-structures are presented. This talk is based on the results of the joint work with V. Mazya.

[1] V. Mazya, S. Nazarov, B. Plamenevskij, Asymptotic theory of elliptic boundary value problems in singularly perturbed domains. Vols 1-2, *Birkhäuser*, (2000).

[2] V. Kozlov, V. Mazya, A. Movchan, Fields in multi-structures, Asymptotic analysis, *Oxford University Press*, (1999).