



HACETTEPE ÜNİVERSİTESİ MATEMATİK BÖLÜMÜ GENEL SEMİNERİ

(HACETTEPE UNIVERSITY MATHEMATICS GENERAL SEMINAR)

Tarih (Date): 27.11.2017, Pazartesi (Monday)

Saat (Time): 15:00

Yer (Place): Yaşar Ataman Seminer Salonu

Konuşmacı (Speaker): Prof. Julius Kaplunov (Keele University, School of Computing and Mathematics, UK)

Başlık (Title): Multiscale Dynamic Modelling of Thin and Periodic Structures

Özet (Abstract):

Modern trends in multiscale dynamic modelling of periodic and thin functionally graded structures are discussed. Similarity of the long wave procedures underlying two-dimensional shell and plate approximations and homogenization for periodic media is demonstrated, beginning with correspondence between shell thickness and periodicity cell size. The presented comparative study of two toy problems, dealing with a periodic string and anti-plane shear of a layered strip, subject to anti-plane shear, aims at clarifying the proposed vision. The main focus is on high frequency schemes, including high frequency long-wave approximations for thin structures and high frequency homogenization for periodic media, oriented to qualitative and quantitative analysis of microscale phenomena, in particular arising in modern metamaterials. The theoretical framework is illustrated by evaluating the dynamic response of periodic and layered structures. For the former, both continuous bodies and discrete lattices are considered. Numerical results for dispersion and localization of Floquet-Bloch and Lamb waves are presented. A practically important case of contrast material parameters is briefly addressed. Further prospects for knowledge transfer are also indicated.

