



SEMINAR

APPLIED MATHEMATICS AND MECHANICS

FS977

31 August 2022

A DCAMM seminar No. 759 will be presented by

**Senior Lecturer Vladislav Sorokin
Dept. of Mechanical Engineering
University of Auckland, Australia**

The title of the lecture is

On some unusual phenomena and practical applications of parametrically excited systems

Abstract:

In mechanical context, a system is typically referred to as parametrically excited when at least one of its parameters varies periodically either with time or a spatial coordinate. Such systems have been exploited in a wide range of applications from vibration suppression to energy harvesting and response amplification. First, several unusual phenomena arising in systems with time varying parameters will be briefly presented, such as gas bubble sinking and heavy particles rising in vibrating fluid-filled volumes. Then systems with spatially varying properties will be considered. Spatially periodic structures feature frequency bandgaps that are frequency ranges in which travelling waves attenuate providing exceptional sound and vibration mitigation performance. A relatively simple approach to predict the locations and bandwidth of the frequency bandgaps for 1D and 2D periodic structures, such as beams and plates, will be presented. Then the effects of nonlinearity and disturbed periodicity, as well as quasi-periodicity, on the frequency bandgaps will be briefly discussed. Theoretical analysis and numerical results illustrating vibration attenuation performance of periodic “supercell” structures will be also presented. Finally, results of experimental testing of large-scale (2.4m by 1m) plates will be discussed showing benefits of using structural variations and related wave scattering phenomena for attenuating vibrations.

DATE:	Tuesday, 6 September 2022
TIME:	13:00 – 13:45
PLACE:	Meeting Room LY101-R3.074 (S12) DTU, Technical University of Denmark

Danish pastry, coffee and tea will be served 15 minutes before the seminar starts.

All interested persons are invited.

Niels Leergaard Pedersen

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