SEMINAR

APPLIED MATHEMATICS AND MECHANICS

FS975 17 August 2022

A DCAMM seminar No. 757 will be presented by

Professor C.J. Chapman
Keele University, United Kingdom

The title of the lecture is

The finite product method in approximation theory, and some applications

Abstract:

Many well-known functions in mathematics can be written as infinite products of simple factors. These include all the basic functions of trigonometry, of which Euler's infinite product for the sine is the best known. Unfortunately, truncations of these expressions to finite products are not normally of use, because of Runge's phenomenon, which is the presence of enormous unwanted oscillations near the boundaries of the domain of interest. In this talk, it will be shown that in a class of applied problems in wave propagation, these high-amplitude oscillations cancel out exactly, to leave an extremely useful family of finite-product approximations, whose high accuracy and range of validity are extraordinary. The talk includes a full account of Runge's phenomenon (for researchers new to the topic), a simple proof of the exact cancellation, using only Stirling's approximation to the Gamma Function (with the `one-twelfth correction'), and some examples of wave propagation in which the resulting finite-product approximations have been put to good use by the speaker and Professor S. V. Sorokin, Aalborg University.

DATE: **Thursday, 1 September 2022**

TIME: **13:00 – 13:45**

PLACE: **Navitas Auditorium 3210-00.117**
Aarhus University,
Inge Lehmanns Gade 10, 8000 Aarhus C

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

All interested persons are invited.

Niels Leergaard Pedersen