EPFL

B. Buffoni - M. Colombo - M.Hairer - Xue-Mei Li - J. Krieger - G. Moschidis

SEMINAR OF ANALYSIS

Friday, May 17, 2024 - Room: MA A1 10 at 2.15 pm

Prof. Erik WAHLÉN

(Lund University - Sweden)

will present a seminar entitled:

« **Steady water waves with vorticity** »

Abstract:

"The steady water wave problem is a classical topic in fluid mechanics which has been studied for over two centuries. It concerns the steady flow of an ideal fluid subject to gravity, bounded above by a free surface. Mathematically it boils down to an elliptic free boundary problem for the stream function. The most well-known situation is that of irrotational flow, where the PDE is simply Laplace's equation with both Dirichlet and Neumann conditions at the free surface. In that case, Stokes conjectured the existence of a highest wave with a peaked crest, which was verified a century later in a seminal work by Amick, Fraenkel and Toland. If one includes vorticity, Laplace's equation changes to a semilinear elliptic equation. This has some dramatic effects which are not yet completely understood. In particular, it opens the door to overhanging waves and `cat's eye' vortices. In my talk, I will report on recent progress on these phenomena, including a new formulation of the problem which allows for overhanging waves and has a structure which is suitable for global bifurcation theory.

Based on joint work with Jörg Weber (University of Vienna)."

Lausanne, May 6, 2024
BB/rb