מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Distinguished Lecture Series

Room 1 ,Ziskind Building
on Tuesday, Dec 26, 2017
at 12:30

Walter Strauss
Brown University

Steady Water Waves

Abstract:

The mathematical study of water waves became possible after the derivation of the basic mathematical equations of fluids by Euler in 1752. Later, water waves, with a free boundary at the air interface, played a central role in the work of Poisson, Cauchy, Stokes, Levi-Civita and many others. It has seen greatly renewed interest among mathematicians in recent years. I will consider classical 2D traveling water waves with vorticity. By means of local and global bifurcation theory using topological degree, one can prove that there exist many such waves. They are exact smooth solutions of the Euler equations with the physical boundary conditions. Some of the waves are quite tall and steep and some are overhanging. There are periodic ones and solitary ones. I will also exhibit some numerical computations of such waves. Many fundamental problems remain open.