EDITORIAL

N. Aksel · H. Irschik · A. Soldati · G. J. Weng · F. Ziegler

Review and Perspective in Mechanics

Published online: 23 February 2016
© Springer-Verlag Wien 2016

In this article of the Review and Perspectives in Mechanics series, we present the work of Professor Mathieu Sellier from the University of Canterbury in New Zealand on Inverse Problems in Free Surface Flows. In fluid dynamics, one usually deals with the direct problem, namely with the cause-to-effect paradigm. In this case, the problem consists of finding the observable consequences of a set of causes and conditions. This review focuses on the inverse problem for which the causes and conditions of the flow are reconstructed from the knowledge of observable consequences. In this effect-to-cause paradigm, the free surface is a signature of the flow, which can be related to unknown flow quantities. The unknown quantities may be boundary conditions or material properties where there exist no practical way to direct measurement or existing ways to provide limited information. An example is the geomorphological flow with the free surface deformation as the only observable quantity. This review provides a comprehensive presentation of the emerging subject of inverse problems in free surface flows and gives inspiring ideas to scientists in mechanics.

N. Aksel (✉)
Bayreuth, Germany
E-mail: tms@uni-bayreuth.de

H. Irschik
Linz, Austria

A. Soldati
Udine, Italy

G. J. Weng
New Brunswick, NJ, USA

F. Ziegler
Vienna, Austria