



SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

GIMNAP-Departamento de Matemática, UBB
Centro de Investigación en Ingeniería Matemática (CI²MA), UDEC

Expositor:

Enrique D. Fernández-Nieto

Departamento de Matemática Aplicada I & IMUS, Universidad de Sevilla, España

Título de la Charla:

***On the Saint-Venant-Exner model
with arbitrarily sloping sediment beds***

Fecha y Hora:

Miércoles 20 de Noviembre de 2019, 15:30 Horas.

Lugar:

**Auditorio Alamiro Robledo, FCFM
Universidad de Concepción.**

Resumen

Firstly, in this talk a formal deduction of the Saint-Venant-Exner model through an asymptotic analysis of the Navier-Stokes equations will be presented. A multi-scale analysis is performed in order to take into account that the velocity of the sediment layer is smaller than the one of the fluid layer. Then, a correction of classical models is proposed. The proposed models have an associated energy and they incorporate a necessary modification that must be taken into account in order to be applied to arbitrarily sloping beds. Some of these simplified models correspond to a generalization of classic ones such as Meyer-Peter & Müller and Ashida-Michiue models. Secondly, a bilayer shallow water type model will be presented, that can be considered to describe bedload sediment transport for strong and weak interactions between the fluid and the sediment. Several numerical tests will be finally presented, to study the evolution of a dune in terms of the repose angle of the material, to see the influence of the proposed definition of the effective shear stress in comparison with the classic one, by comparing the Saint-Venant-Exner model with the bilayer one, and by comparing with experimental data.