SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

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Título de la Charla:

Multiscale control of generic second order traffic models by driver-assist vehicles

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Lugar:

Seminario online

Plataforma Zoom

Resumen

We study the derivation of generic high order macroscopic traffic models from a follow-the-leader particle description via a kinetic approach. First, we recover a third order traffic model as the hydrodynamic limit of an Enskog-type kinetic equation. Next, we introduce in the vehicle interactions a binary control modelling the automatic feedback provided by driver-assist vehicles and we upscale such a new particle description by means of another Enskog-based hydrodynamic limit. The resulting macroscopic model is now a Generic Second Order Model (GSOM), which contains in turn a control term inherited from the microscopic interactions. We show that such a control may be chosen so as to optimise global traffic trends, such as the vehicle flux or the road congestion, constrained by the GSOM dynamics. By means of numerical simulations, we investigate the effect of this control hierarchy in some specific case studies, which exemplify the multiscale path from the vehicle-wise implementation of a driver-assist control to its optimal hydrodynamic design.