

SEASEN Session 3 (Nonlinear Evolution PDEs)
Speaker 2

On a model of hyperbolic equation perturbed with saturating diffusion and linear dispersion

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We consider a scalar hyperbolic conservation law perturbed by saturating diffusion and linear dispersion of the form $u_t + f(u)_x = \epsilon \left(u_x / (1 + u_x^2)^\alpha \right)_x + \delta u_{xxx}$, where $\alpha > 0$ and ϵ, δ are small positive parameters. First, we study the existence of particular solutions that are travelling waves. In the diffusive case ($\delta = 0$) the existence of smooth travelling waves depends on the value of α , and we prove their convergence ($\epsilon \rightarrow 0$) to the shock waves of the hyperbolic equation provided that $\alpha < 1/2$. When $\epsilon, \delta > 0$ the existence of travelling waves is established while their behaviour depends on the parameters ϵ, δ and α . Last, the convergence of the general solution to the entropy solution of the hyperbolic equation is also investigated.

This is joint work with N. Bedjaoui and J. M. C. Correia.