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Mês de: Janeiro 2010

SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

Dia 21 de Janeiro (quinta-feira), às 14h30, na Sala B3-01

"Regularized models for strongly nonlinear internal solitary waves"

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Abstract:

We consider strongly nonlinear long wave models for large amplitude internal waves in two-layer flows. Both rigid-lid and free-surface are set for the upper boundary. It is shown that these models suffer from the Kelvinâ?"Helmholtz (KH) instability so that any given shear (even if arbitrarily small) between the layers makes short waves unstable. Because a jump in tangential velocity is induced when the interface is deformed, the applicability of the models to describe the dynamics of internal waves is expected to remain rather limited. To overcome this major difficulty, the models are written in terms of the horizontal velocities at certain preferred vertical levels, instead of the depth-averaged velocities. Through local stability analysis, it is shown that the new form of the models changes the dispersion relation in a way that internal solitary waves become stable to perturbations of arbitrary wavelengths, as long as their amplitudes do not exceed a certain critical value.

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