Ciências ULisboa

SEMINÁRIO

ANÁLISE E EQUAÇÕES DIFERENCIAIS

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A phase-filed approximation for a surface--evolution energy with a density

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Abstract:

A perimeter type energy leading an epitaxial growth process is treated. We consider an energy of the type

$$\mathcal{F}(E,u) = \int_{\partial E} \psi(u)^{n-1}$$

where a density $\mathrm{u}\colon\ \partial E \to \mathbb{R}$ living on the boundary of E is considered as a variable of the problem.

Such energy has been used to model an epitaxial growth process with the presence of adatoms: free atoms of the crystal allowed to move on the surface and which impacts the chemical potential of the evolution. In this context the set E represents the bulk, ∂E is the surface that is evolving in the process and the density u cathces the presence of the so-called adatoms.

Such energy lacks of lower-semicontinuity in the natural topology under which the problem can be considered. In a contribution of 2016 jointly with Riccardo Cristoferi and Laurent Dietrich we provided a lower-semicontinuous envelope of $\mathcal{F}$ and, subsequently, a phase-field approximation is developed.

I will briefly describe the models involving $\mathcal{F}$, the state of art and the lower-semicontinuous envelope calculation.

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