Numerical study of a phase-field model for crystal growth

By

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The aim of this talk is to present a phase-field model for crystal growth that is very well known in material sciences and very less known in the world of mathematics. The numerical difficulties related to solving this problem are numerous and include non-linearities in the model that depend on the phase-field parameter and it's space derivatives. Nevertheless, setting parameters of the model close to the known thermo-physical properties of the studied material, we were able to develop a finite element code using a straightforward semi-implicit time scheme that allows to track the progress of the phase-change interface thanks to mesh refinement techniques. The code has proven to be accurate and allowed to recover the analytical value of the tip's growth velocity predicted by solvability theory.