



Departamento
de Matemática
Aplicada



Seminario de Matemática Aplicada

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Approximate solution techniques for a free boundary problem arising in the diffusion of glassy polymers

This talk considers approximate solution methods for a one dimensional Stefan problem describing solvent diffusion in glassy polymers. Solvent diffusion in polymer systems is an important problem in the pharmaceutical industry as it greatly affects the drug delivery processes. It can be thought of as a Stefan problem, which usually describes the melting or solidification of a material, and these occur in a wide variety of natural and industrial applications. Similar to the classic Stefan problem, the region initially has zero thickness and so must be analysed carefully before performing a numerical computation. A small-time analysis gives the correct starting solution which is then incorporated into the second order accurate Keller box finite difference scheme. We also describe an analysis of small and large time expansions, as well as the large control parameter limit, and show that our generalised approach enables us to obtain higher order terms than given in previous studies. Finally, we apply the combined integral method (CIM) to this problem, which is a refinement of the popular heat balance integral method (HBIM), and compare both the CIM and asymptotic solutions to the numerical results.

Organizado por el Departamento de Matemática Aplicada, el Grupo MOMAT y el Instituto de Matemática Interdisciplinar (IMI).

Miercoles 23 de mayo a las 11:00 hs.
Seminario Alberto Dou (sala 209)
Facultad de CC Matemáticas, UCM