Congress on Numerical Methods in Engineering
Lisboa, June 29 to July 02, 2015

RESUMO N° 18

A STUDY FOR COMPUTATIONAL COST OPTIMIZATION FOR INFLUENZA FLU INCLUDING VACCINATION'S IMPACT

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Keywords: Optimization, Mesh Refinement, Epidemiologic Problems, Computer and Mathematical Modelling

This work proposes a mathematical formulation of epidemics caused by influenza viruses and the numerical solution of the proposed model. We study in particular the propagation of the influenza virus considering the impact of vaccination campaigns in the disease dynamics and also the loss of efficiency of the vaccine.

The numerical solution of the proposed model is found by means of a finite difference method. In addition, a numerical optimization procedure is applied to minimize the computational cost of solving the non-linear ordinary differential equations that define the model. This procedure makes use of a grid refinement framework which, in turn, utilizes some properties of linearly converging algorithms to generate an optimal sequence of approximate models that converges to the true model. Such a sequence is optimal with respect to the total computational cost and minimizes the computational time to find a solution to the proposed model. As a result, such a framework can result in significant computational savings, thus speeding up the solution procedure.