Seminário em Engenharia Matemática

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Optimization in Generalized Linear Models: a Case Study and an Industrial Application

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In this talk I will present recent results of a comparison study on different optimization techniques in the context of Generalized Linear Models (GLM). In addition to the classical method for estimating GLM parameters is the Fisher scores, in a recent work [1] we have presented the computation of the estimates of the GLM parameters with two alternative optimization methods: (i) a derivative-based optimization method, namely the BFGS method which is one of the most popular of the quasi-Newton algorithms, and (ii) the PSwarm derivative-free optimization method that combines features of a pattern search optimization method with a global Particle Swarm scheme. As a case study we use a dataset of biological parameters (phytoplankton) and chemical and environmental parameters of the water column of a Portuguese reservoir. The application of GLM in the industrial context of prediction of textile parameters is also presented. This application was the result of the work developed during the 109th ESGI that took place in May 2015 in answer to industrial problem posed by Continental ITA [2].

[1] E. Costa e Silva, A. Correia and I. C. Lopes, "Optimization in Generalized Linear Models: a Case Study", in AIP Conference Proceedings (4 pages); 13rd International Conference on Numerical Analysis and Applied Mathematics (2015).

[2] A. Correia, A. J. Soares, C. Ribeiro, E. Costa e Silva, A. I. F. Vaz and M. Meireles. "Report on Prediction model to textile parameters". Problem presented by Continental ITA at the 109th European Study Group with Industry, Guimarães, 2015.