TRADITIONAL AND GENERALIZED SENSITIVITY FOR AN ELLIPTIC PARTIAL DIFFERENTIAL EQUATION WITH INTERFACES

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Abstract. The problem of parameter estimation is very important not only from the mathematical point of view but also due to its applications in real problems that arise in different disciplines like biology, chemistry, physics, medicine among others. The analysis of the sensitivity of the output of the model with respect to the parameters plays a key role to this end.

Two different approaches are proposed in the literature to evaluate these sensitivities. One of them is known as the Traditional Sensitivity Function (TSF). These sensitivities provide information about the variation of the output of the model with respect to the parameters. The other one, known as Generalized Sensitivity Function (GSF) was proposed by Tomaseth and Cobelli in 1999. It was introduced to analyze the distribution of the information contained in the output with respect to the model parameters for a given set of observations.

In this work we study both sensitivities for an elliptic partial differential equation with interfaces. Numerical results are presented and discussed for a particular equation that models the electric potential distribution generated by a given source in a multilayer spherical domain.