1023-92-950 **Rachael S Hageman*** (rachael.hageman@case.edu), Case Western Reserve University, Department of Mathematics, 10900 Euclid Avenue, Cleveland, OH 44106, **Erkki Somersalo** (erkki.somersalo@hut.fi), Helsinki University of Technology, Institute of Mathematics, P.O. Box 1100 FIN-02015 HUT, Finland, and **Daniela Calvetti** (daniela.calvetti@case.edu), Case Western Reserve University, Department of Mathematics, 10900 Euclid Avenue, Cleveland, OH 44106. *Large scale Bayesian parameter estimation and sensitivity analysis for the cardiac metabolism during ischemia.*

The dynamics of a three compartment model of the cardiac metabolism are described by a large system of coupled non-linear ordinary differential equations that depends on a large number of parameters. The complexity of the model, the scarcity of the measured data and the added complication that several of the parameter values are not physical makes the determination of suitable values of the model parameters a challenging process. We propose a study of the sensitivity which is particularly efficient when the parameters have been estimated following the Bayesian paradigm that takes into account the variations of the sensitivity with respect to time and over a sample drawn from the posterior density. The study of the sensitivity of the data and of the quantities of interest in the simulation of the individual parameters is important for understanding the stability of the specified model. This Bayesian setting allows us to analyze: the dynamic sensitivity of biochemical species of interest to perturbations in the parameters, and how the sensitivity of different metabolic processes change during myocardial ischemia, e.g., the sensitivity of processes such as glycolysis and lactate production to redox states in cytosol and mitochondria. (Received September 23, 2006)