Nonlinear filtering of a stochastic neural mass model

H. Hinterleitner, Institute for Stochastics, JKU Linz, Harald.Hinterleitner@jku.at
E. Buckwar, Institute for Stochastics, JKU Linz, Evelyn.Buckwar@jku.at

Neural mass models provide a useful framework for modelling mesoscopic neural dynamics. We briefly discuss the Jansen and Rit Neural Mass Model (JR-NMM) [1] which has been introduced as a model in the context of electroencephalography (EEG) rhythms and evoked potentials and has been discussed for several times in the literature, for example [2], [3] and [4]. In this poster, we first propose a stochastic version of the JR-NMM incorporating random input and we briefly discuss existence and uniqueness of the solution of these equations. Then, we apply the nonlinear filtering framework [5] to the stochastic JR-NMM in order to solve the inverse problem, i.e. to compute certain parameters from EEG measurements. We determine an equation for the exact solution of the nonlinear filtering problem and solve it numerically by a continuous-time particle filter.

References

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