1154-34-1002 **Oksana A Chkrebtii*** (oksana@stat.osu.edu) and **David A Campbell** (dac5@sfu.ca).

Adaptive step-size selection for state-space probabilistic differential equation solvers.

When models are defined implicitly by systems of differential equations with no closed-form solution, small local errors in finite-dimensional solution approximations can propagate into deviations from the true underlying model trajectory. Some recent perspectives in quantifying this uncertainty are based on Bayesian probability modeling: a prior is defined over the unknown solution and updated by conditioning on interrogations of the forward model. Improvement in accuracy via grid refinement must be considered in order for such Bayesian numerical methods to compete with state of the art numerical techniques. We apply principles of Bayesian statistical design to develop an adaptive probabilistic method to sequentially select time-steps for state-space probabilistic ODE solvers. We investigate the behaviour of local error under the adaptive scheme which underlies numerical variable step-size methods. Numerical experiments are used to illustrate the performance of such adaptive schemes, showing improved accuracy in terms of global error over uniform designs when small step lengths are considered. (Received September 12, 2019)