1135-37-1403 **Melike Sirlanci*** (sirlanci@usc.edu), University of Southern California, Department of Mathematics, Los Angeles, CA 90089, **Susan E Luczak** (luczak@usc.edu), University of Southern California, Department of Psychology, 90089, and **I G Rosen** (grosen@usc.edu), University of Southern California, Department of Mathematics, Los Angeles, CA 90007.

Estimating the Distribution of Random Parameters in an Abstract Parabolic System Modelling Transdermal Alcohol Biosensor.

We estimate the distribution of random parameters based on aggregate population data in a family of infinite dimensional dynamical systems with unbounded input and output operators. The systems that we consider are governed by regularly dissipative, or abstract parabolic, operators in a Gelfand triple setting. Our approach synthesizes some recent results on random systems of this form with an abstract approximation framework for the estimation of distributions of random parameters in dynamical systems. We are able to rewrite the system in such a way that the random parameters can be treated as additional space variables and the system becomes amenable to application of results from standard (deterministic) linear semigroup theory. In stating our approximation results we make use of well-known convergence results for sequences of linear semigroups of operators. Our work is motivated by the problem of estimating blood alcohol concentration (BAC) based on the aggregate data in the form of transdermal alcohol levels in a population collected using a biosensor that detects and counts ethanol molecules on the surface of the skin. Numerical results involving actual clinical and field data will be presented and discussed. (Received September 21, 2017)