Presentation for the Symposium on BEER *November 2020*

Viewing ODE Models Through A New Lens: The Generalized Linear Chain Trick

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ODE models can often be viewed as mean-field models of continuous time stochastic state transition models, yet commonly used "rules of thumb" often yield models with oversimplified (implicit) assumptions. Here I will present some recent results that provide modellers a more rigorous foundation for building a more flexible set of dwell time (aka passage time) assumptions into such models, and for interpreting model results drawing upon tools and theory from Markov chains and related stochastic processes. In this presentation, I will introduce our Generalized Linear Chain Trick (GLCT) framework that extends the LCT to a much broader set of possible model assumptions, including the incorporation of phase-type distributed dwell times. I will also present some examples of the computational and analytical benefits of working with ODE models using this approach.