May 18th, 6:00 PM - 6:30 PM

Noisy Neural Oscillators with Intrinsic and Network Heterogeneity

Kyle P. Wendling
Virginia Commonwealth University, wendlingk@vcu.edu

Cheng Ly
Virginia Commonwealth University, cly@vcu.edu

Noisy Neural Oscillators with Intrinsic and Network Heterogeneity

Kyle Wendling[1], Cheng Ly[1]
[1] Department of Statistical Sciences and Operations Research, Virginia Commonwealth University, Richmond, VA 23284, USA
E-mail: wendlingk@vcu.edu

Noisy phase oscillators have been invaluable for characterizing dynamics in many areas of the physical and life sciences. In neuroscience in particular, they have been fruitful for developing new mathematics and in addressing neuroscience questions because these models incorporate an experimentally measurable entity. Heterogeneity of neural attributes is recognized as a crucial feature in neural processing. With this feature in mind, we study the population firing rate statistics in a heterogeneous coupled network of phase models. We consider two sources of heterogeneity, intrinsic and network, both of which have been widely reported in experiments. We find that the relationship between intrinsic and network heterogeneity can lead to relatively large differences in the firing rate distribution. We present analytic theory to capture the shape of the firing rate distribution, and use it to uncover how intrinsic and network heterogeneity interact to yield these different firing rate distributions.