

How is variability measured?

Chung-Kang Peng

BIDMC / Harvard Medical School

Outline

Why are we interested in variability generated by biological systems?

- Biological systems are constantly perturbed by external and internal stimuli even under basal conditions. Thus, the dynamical responses (variabilities) to these challenges will reflect a system's complexity
- The dynamical features of these variabilities that reflect the complexity of the underlying system will be degraded by aging and diseases

What types of variability are usually observed?

-- Biological variability is typically observed for

- systems under free-running conditions
- systems performing targeted tasks
- systems performing targeted tasks while under stressful challenge

What aspects of variability are important to quantify?

- Fractal (self-similar) properties
- Multiscale information content
- Linguistic structures
- Non-equilibrium characteristics (including time asymmetry)

I'll briefly discuss algorithms that can quantify these features and possible applications to TBI data.