



Center for Statistical Science Seminar



An Elastic Combination of Amplitude and Phase Model for Functional Data

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Abstract: The classical functional data analysis mainly focuses on the shape and amplitude variability of curve data, which are often distorted by oscillations in the time domain. Although warping procedures can be first applied to align the curves, amplitude and phase variations are often tangled together and may not be separable. In this paper, we propose an elastic combination of amplitude and phase (eCAP) model based upon a novel metric d_T on function space to jointly model the variations in both directions. The elasticity is introduced to allow different modeling emphasis of the amplitude and phase features, which also provides a new perspective of the separability problem. An iterative algorithm is developed to seek the d_T -induced sample Fréchet mean and the corresponding optimal warping functions. We further decompose the Fréchet variance into amplitude and phase variations, and analyze the warped and warping functions through functional principal component analysis. Moreover, we prove the strong consistency of proposed mean and variance estimators, and show the properties of the new metric d_T . Finally, the performance of the eCAP is illustrated in simulations and two real-life examples.

Date: *Thursday, 28 Feb. 2019*

Time: *3:00p.m.-4:00p.m.*

Venue: *Room 5583, Academic Building
(near Lifts 27/28), HKUST*