

What Is Dependence?

吳偉標
芝加哥大學統計系

Abstract

In the study of random processes, dependence is the rule rather than the exception. To facilitate the related statistical analysis, it is necessary to quantify the dependence between observations. In the talk I will briefly review the history of this fundamental problem. By interpreting random processes as physical systems, I will introduce physical and predictive dependence coefficients that quantify the degree of dependence of outputs on inputs. Relations with nonlinear system theory and riskmetrics will be discussed. Such dependence measures provide a new framework for the study of random processes and shed new light on a variety of problems including robust estimation of linear models with dependent errors, nonparametric inference of time series, representations of sample quantiles, bootstrap for time series, spectral estimation among others.