

Colloquium

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Tuesday, November 27, 2012

11:00a.m., HH-3026

Testing for Trend and Carryover Effects in Recurrent Events

Abstract:

Processes in which individuals, units or systems experience recurrent events arise in many contexts. Two important features of the recurrent event processes are time trends and event clustering. A general concept of trend is elusive, and perhaps because of this reason, the dependence of the behaviour of tests on the assumed definitions of trend and on the observation periods for the processes has been largely ignored. We discuss these issues and study them through analytical results and simulation studies. We also present robust tests for trend across multiple processes, extend them to deal with interval-censored event times, and compare them and other well known trend tests with respect to the issues mentioned. Methods are applied to a data set from industry.

Another aspect of the recurrent event processes that may lead to clustering of events over time is the presence of what we term carryover effects. By this we refer to settings where the occurrence of one event or some condition may temporarily alter the probabilistic characteristics of event occurrences. We consider models and tests for such carryover effects. We provide tests for no carryover effect which are simple to interpret and reasonably robust. In addition, we demonstrate the need for detailed modeling in trying to deconstruct the dynamics of recurrent events. An illustration based on a study of asthma attacks in children will be given.

Teaching Demonstration: Monday, November, 26th, 3:00p.m., HH-3026

Topic: "Hypothesis testing -- Most powerful test", Section 8.3.2 of Casella and Berger's book 'Statistical Inference', 2nd ed.