STATISTICS SEMINAR

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Splines, differential equations and optimal smoothing

In many scientific areas it is of primary interest to describe the dynamics of a system evolving over time and/or space. In the simple one-dimensional case the state of the system at any time can be represented by a function which values track the evolution of a given phenomenon. One way to approximate this function is to take measurements at different values of the independent variable(s) and to fit the observed data in order to estimate a formula for it. This is the point of view exploited in statistical data analysis. Overparametric regression (smoothing) techniques are usually applied in this kind of studies. Such a model would tell us how the system evolves but is not able to clarify why the system behaves as it has been observed. Therefore we can formulate mathematical models summarizing the understanding we seek. Often these models are based on differential equations that relate the state function to one or more of its derivatives w.r.t. the independent variable(s). We present a flexible way to combine the statistical and the dynamic modeling points of view. To reach this goal we combine in a convenient way the flexible data description provided by a semi-parametric regression analysis and the physical interpretability of dynamics summarized by differential equations.

Friday, May 17, 2013 - 14h00 - Room 0/33 (Building B37)
Rue Grande Traverse 12, 4000 Liege (Parking P32-33)