ADVANCES IN THE GEOMETRY OF NON-PARAMETRIC EXPONENTIAL MODELS

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(1) The theory of exponential manifolds modeled on Orlicz spaces, based the joint work with C. Sempi, M.-P. Rogantin, P. Gibilisco (1995-1999), has been improved in the basic construction in the PhD thesis of A. Cena (2002). He also made some advancement in the study of the related Amari connections. The first part of the talk will review this basic improved construction and review the particular case of Wiener spaces and related joint work with P. Gibilisco and D. Imparato.

(2) The approximation of non parametric models with parametric ones recently raised some interest, especially with reference to applications to Finance Mathematics. However, some of the proposed approximation methods do not converge in the sense on the manifold topology, which is a very strong topology. The approximation with finite state space appears to be more promising in this sense.

(3) Information geometry of finite state space models has special algebraic features that where first discussed in Pistone & Riccomagno & Wynn "Algebraic Statistics" (2001) . The key notion is the notion of toric ideal firstly used in Statistics by P. Diaconis and B. Sturmfels (1998). An important feature of this theory is associated with the use of symbolic computational software such as Singular or CoCoA. Conversely, the use of algebraic geometry ideas in continuous state space is just at the beginning, as in Pistone & Wynn "Finitely generated cumulants" (1999). This last and main part of the talk will discuss the connections between Information Geometry and Algebraic Geometry.