Plenary course   **Selected Topics on "Distorted models and applications"**

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Conference 1:   Distorted models

Conference 2:   Applications of distortions to complex systems

Conference 3:   Multivariate distorted models and applications to quantile regression

1. Distorted models

The distorted models were introduced in the Theory of Choice under Risk to represent the uncertainty in the baseline distribution F. They consider that this distribution can change due to external reasons represented by a distortion function q obtaining a new (distorted) distribution q(F). These models can also be used to describe other practical situations as proportional hazard or reversed hazard rate models (PHR, PRHR), order statistics, coherent systems, record values, etc. In this lesson we will see the main properties of these models, obtaining properties for stochastic comparisons of them (in the most usual orders). We will also see when they preserve some stochastic aging classes. We will also consider some extensions of them.

2. Applications of distortions to complex systems.

In this lesson we will show how to apply the results for distortions to coherent systems. We will consider two main options: homogeneous (i.e. identically distributed) or heterogeneous components. In both cases we will study stochastic comparisons for systems with different structures. The preservation of aging classes under the formation of systems will be considered as well.

3. Multivariate Distorted models (MDM).

In the last lesson we will show how, in some situations, MDM can be a good alternative to the classical copula models. In particular, we will show how they can be applied to get quantile regression models which a good alternative to the classical linear regression models. We will see how to get predictions and confidence bands for that predictions by using the statistical program R.