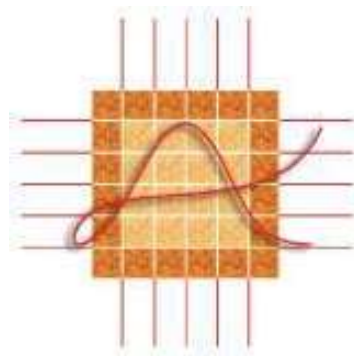




# Book of Abstracts

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# Analyzing discount functions through differential geometry: stabilization of intertemporal preferences

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## Extended abstract<sup>1</sup>

Inter-temporal choices are decisions under uncertainty, the effects of which only become apparent over time. The Discounted Utility (DU) [1] is the mathematical model of reference for describing intertemporal preferences and was formalized by assuming that the discount function has an exponential trend, an assumption that has been questioned due to the observed discrepancies (called anomalies) between the empirical and theoretical behaviors.

Hyperbolic discounting is more in line with the description of empirical behaviors and, together with developments in behavioral finance [2], it has been possible to realize that decision-makers act less rationally than they think because of systematic behavioral distortions that influence the cognitive process.

The present paper aims to investigate stable preferences, defined here as those for which the local measure of non-stationarity, quantified in the literature by the instantaneous discount rate and, eventually, by the degree of decreasing impatience [3], converge as  $t$  tends to infinity.

Our contribution consists of two aspects. The first concerns the application of differential geometry to the study of discount functions, enriching the mathematical description of the discount function. The second result consists in verifying that the tendency of the instantaneous discount rate to decrease to zero (and, thus, the local measure of non-stationarity) which implies the tendency of the curvature to zero. This dynamic, labeled as non-stationarity preference stabilization, indicates that the assumptions of non-stationarity and dynamic inconsistency occur in a neighborhood of infinity with convergence of the main measures of such inconsistent behavior. These results improve [4] and [5] in which the degree of decreasing impatience is used to interpret anomalies in the discounted utility model by contextualizing the degree of decreasing impatience with cognitive and emotional biases involved in decision-making.

**Keywords**

Decreasing impatience; Curvature; Intertemporal choice; Stabilization; Uncertainty

**References**

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**Contribution in a special session:** -

**If YES, session:** -

**If NO, area:** Financial Mathematics, Decision Theory.