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Representation theory for risk on markowitz-tversky-kahneman topology

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Abstract

We introduce a representation theory for risk operations on locally compact groups in a partition of unity on a topological manifold for Markowitz-Tversky-Kahneman (MTK) reference points. We identify (1) emph{risk torsion} induced by the flip rate for risk averse and risk seeking behaviour, and (2) a structure constant or coupling of that torsion in the paracompact manifold. The risk torsion operator extends by continuity to prudence and maxmin expected utility (MEU) operators, as well as other behavioural operators introduced by the Italian school. In our erstwhile chaotic dynamical system, induced by behavioural rotations of probability domains, the loss aversion index is an unobserved gauge transformation; and reference points are hyperbolic on the utility hypersurface characterized by the special unitary group $SU(n)$. We identify conditions for existence of harmonic utility functions on paracompact MTK manifolds induced by transformation groups. And we use those mathematical objects to estimate: (1) loss aversion index from infinitesimal tangent vectors; and (2) value function from a classic Dirichlet problem for first exit time of Brownian motion from regular points on the boundary of MTK base topology.