Department of Decision Sciences

De Finetti Risk Seminar

Computational Risk Assessment – From Probability Theory to Predictive Practice

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Abstract

Safety is central to the design, operation, and economics for many of today's complex systems. Designers commonly "over-design" portions of a system to provide robustness in the form of redundant and diverse features to ensure protection. However, the ability to better characterize safety margin is important to improved decision making about design and operation of systems. An enhanced approach to characterizing safety margins and the subsequent risk-informed margins management options represents a vital input to analysis and decision making.

The US Department of Energy has implemented the Risk-Informed Safety Margins Characterization (RISMC) Pathway to support decisions with the aim to improve economics, reliability, and sustain safety of complex systems. In this talk, we will describe how we are demonstrating a risk-assessment method that is coupled to safety margin quantification, building upon the theoretical work of researchers like Bruno de Finetti. We will describe how decisions are supported by combining mechanistic physics-based models with probabilistic quantification approaches – integrating these two worlds leads us to predictions based upon computational risk assessment.