

# Dynamic Risk Measures and Stochastic Calculus

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## Abstract:

The main aim of this talk is to present an approach for the transition from risk measures in discrete time to their counterparts in continuous time. After a general introduction to risk assessment in mathematical finance it is shown that a large class of risk measures in continuous time can be obtained very naturally as limits of time-consistent risk measures in a discrete setting. The discrete-time risk measures are constructed from properly rescaled ('tilted') one-period risk measures, using a  $d$ -dimensional random walk converging to a Brownian Motion. Under suitable conditions (covering the classical one-period risk measures) we obtain convergence of the discrete risk measures to the solution of a backward stochastic differential equation, defining a risk measure in continuous time, whose driver can then be viewed as the continuous-time analogue of the discrete 'driver' characterizing the one-period risk. We derive the limiting drivers for the semi-deviation risk measure, Average Value at Risk, and the Gini risk measure in closed form. This is joint work with my PhD advisor Patrick Cheridito.