MULTIVARIATE ELLIPTIC PROCESSES

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As Granger's work emphasized, in statistical inference with time series it is crucial to know whether the series is stationary, and much easier to handle the stationary case. In mathematical finance, stationarity is a natural assumption because one begins by discounting everything. As Markowitz's work emphasized, we should hold a balanced portfolio of assets, and so need to work in high dimensionality d. We are thus in danger of Bellman's *curse of dimensionality*. One approach is to model the evolution of our d-vector of (discounted) prices as driven by an unobserved one-dimensional noise process, the *risk driver*. The static (or distributional) aspects of this approach were developed in some detail in papers by Bingham & Kiesel (2002) and Bingham, Kiesel & Schmidt (2003), using the theory of self-decomposability (SD) and distributions of Type G. We here extend this to the dynamic case. We work with both Lévy processes and diffusions. We discuss discrete v. continuous time, jumps v. diffusions, and semi-martingales; there are connections with recent work of Ait-Sahalia, Jacod and others. We illustrate our results with some data analysis.