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HSBC

Multiplicative Cascades and their Applications

George Fitton completed his Ph.D. in Physics at École des Ponts Paris, and his undergraduate studies in Mathematics at Reading University. His research interests are stochastic cascade processes, and more generally the analysis, understanding, and modelling of non-linear variability in complex systems. From 2013 to 2016 he was lead researcher in the research group HM&Co at École des Ponts, subsequently joining HSBC's Independent Model Review team in Kraków in early 2017. George will be presenting a subject on *Multiplicative Cascades and their Applications*.

Multiplicative cascades are generic scaling processes generated by dynamic scale-invariant mechanisms repeated multiplicatively from scale to scale. Initially developed to model turbulent energy fluxes they are now considered fundamental tools for understanding non-linear and complex science. Hence, we first introduce discrete-in-scale cascades as a model for scaling processes in turbulence, then review continuous-in-scale cascades and some of their properties. Particular attention is paid to integrated multiplicative cascades that are characterized by power law probability distributions. Some recent developments in this area are pointed out and their relevance to applications in engineering, physics, and finance are discussed.