

BI-DIRECTIONAL GRID CONSTRAINED STOCHASTIC PROCESSES' LINK TO MULTI-SKEW BROWNIAN MOTION

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SUMMARY

Bi-directional grid constrained (BGC) stochastic processes (BGCSPs) are identified as a variant rather than a special case of the multi-skew Brownian motion (M-SBM). This is because they have their own complexities, such as the barriers being hidden (not known in advance) and not necessarily constant over time. We provide a M-SBM theoretical framework and also a simulation framework to elaborate deeper properties of BGCSPs. The simulation framework is then applied by generating numerous simulations of the constrained paths and the results are analysed. BGCSPs have applications in finance and indeed many other fields requiring graduated constraining, from both above and below the initial starting position.

Keywords and phrases: Wiener Processes, Itô Processes, Reflecting Barriers, Stochastic Differential Equation (SDE), Stopping Times, First Passage Time (FPT), Multi-Skew Brownian Motion (M-SBM).

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