Testing the rank of the covariation matrix: A random perturbation approach

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Abstract: In this paper we present a test for the maximal rank of the matrix-valued volatility process in the continuous Ito semimartingale framework. Our idea is based upon a random perturbation of the original high frequency observations of an Ito semimartingale, which opens the way for rank testing. We develop the complete limit theory for the test statistic and apply it to various null and alternative hypotheses. Finally, we demonstrate a homoscedasticity test for the rank process.

Keywords: central limit theorem, high frequency data, Ito semimartingales, rank estimation.