



On the relation between the Smith-Wilson method and integrated Ornstein-Uhlenbeck processes

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Abstract

In the report "Risk-Free Interest Rates - Extrapolation Method" published by EIOPA it is stated on p. 13 that the so-called W-functions of the Smith-Wilson extra/ interpolation method can be interpreted as covariances to an integrated Ornstein-Uhlenbeck yield curve model. The authors have not seen a formal motivation of this fact, hence they have investigated under what assumptions that the statement is valid. In the present note it is concluded that the statement is true given that the underlying O-U process is *scaled*, has a certain parametrisation and a stochastic starting point with a certain expected value and variance. Moreover, the entire extra/ interpolation method can be interpreted as the conditional expectation of a simple yield curve model *driven by* an integrated O-U process. The proposed method does not rely on an explicit O-U process assumption, but rather applies to a wider class of Gaussian processes.

Keywords: Stochastic yield curve model, Gaussian processes, Interpolation, Solvency II

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