Forum 5: Mathematical Modelling of the Term Structure of Interest Rates

9th November, Wednesday

9 am – 9.45 am Karol Gellert (University of Technology, Sydney)

Title: Term Structure Modelling from the SOFR Perspective

Abstract: The Secured Overnight Funding Rate (SOFR) has become the main benchmark for US dollar interest rates; thus models need to be updated to reflect the key features exhibited by the dynamics of SOFR and the forward rates implied by SOFR futures. As an index based on transactions in the Treasury overnight repurchase market, the dynamics of SOFR are closely linked to the dynamics of the Effective Federal Funds Rate (EFFR), which is the interest rate most directly impacted by US monetary policy target rate decisions. Therefore, these rates feature jumps at known times (Federal Open Market Committee meeting dates), and market expectations of these jumps drive the prices for futures contracts written on these rates. On the other hand, forward rates implied by Fed Funds and SOFR futures continue to evolve diffusively. The models presented in this talk reflect these features of SOFR dynamics. In particular, they reconcile diffusive forward rate dynamics with piecewise constant paths of the target short rate. The first, Gaussian version of the model allows us to extract the factor dynamics from market data, informing the stochastic modelling choices in the second version of the model, which is calibrated to market prices for options on SOFR futures.

10 am – 10.30 am Peter Morrison (University of Technology, Sydney)

Title: Diffusion Theory of Asian Options Pricing- An Index Transform Approach

Abstract: This talk will show some new techniques for developing pricing theory of Asian (arithmetic average) options pricing. We discuss the basic derivation of the diffusion equations, and how various techniques from potential theory can be applied to solve these complex expressions. The Whittaker (confluent hypergeometric) functions are introduced, and we discuss how these functions are related to other systems including Mehler-Fock and modified Bessel functions. We close with a brief analysis of some index transforms and the kernels related to these integral transforms.