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Markov-modulated affine processes

Abstract: We study Markov-modulated affine processes (abbreviated MMAPs), a class of Markov processes that are created from affine processes by allowing some of their coefficients to be a function of an exogenous Markov process X. MMAPs largely preserve the tractability of standard affine processes, as their characteristic function has a computationally convenient functional form. Our setup is a substantial generalization of earlier work, since we consider the case where the generator of X is an unbounded operator. We prove existence of MMAPs via a martingale problem approach, we derive the formula for their characteristic function and we study various mathematical properties.