

Stochastic Differential Games of Optimal Portfolio Strategies with Regime-Switches

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We apply dynamic programming principle to discuss two optimal investment problems by using zero-sum and nonzero-sum stochastic game approaches in a continuous-time Markov regime-switching environment. The first application is a zero-sum game between an investor and the market, and the second one formulates a nonzero-sum stochastic differential portfolio game as the sensitivity of two investors' terminal gains. We derive regime-switching Hamilton-Jacobi-Bellman-Isaacs equations and obtain explicit optimal portfolio strategies. For our second game, we illustrate our results in a two-state special case and observe the impact of regime switches by comparative results.