Fitted Finite Volume Method for Optimal Portfolio in a Exponential Utility Regime-Switching Model

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The focus of the present work is a system of weakly coupled degenerate semi-linear parabolic equations of optimal portfolio in a regime-switching with exponential utility function. We extend this model, developing additional problems - IBPM and IWPM for solving indifference buyer's and writer's prices, respectively. Further, we establish comparison principle for the first model and on this base we prove a maximum principle for IBPM and IWPM. The above models are solved numerically by fitted finite volume method. We prove the discrete maximum principle and convergence of the numerical solutions in maximal norm. Numerical results, illustrating the theoretical statements are presented and discussed.