# Continuous-Time Optimal Portfolio Selection Using Mean-CaR Models

Zhong-Fei Li [1*], Kai W. Ng [2] and Xiao-Tie Deng [3]

[1] *Department of Risk Management and Insurance, Lingnan (University) College,*
*Sun Yat-Sen University, Guangzhou 510275, People's Republic of China*
[2] *Department of Statistics and Actuarial Science, The University of Hong Kong,*
*Pokfulam Road, Hong Kong*
[3] *Department of Computer Science, City University of Hong Kong,*
*Kowloon, Hong Kong*

**Abstract:**   This paper studies continuous-time optimal portfolio selection under the setting of Black-Scholes financial markets and constant re-balanced portfolio (CRP) investment strategies. Three mean-CaR models are formulated, which minimize the risk measured by capital-at-risk (CaR) under the constraint that the expected terminal wealth is not lower than a pre-assigned level. These models are converted into bi-level optimization problems by virtue of a decomposition of the feasible solution set and, as a result, explicit optimal strategies and efficient frontiers are obtained in closed-form. A comparison of the three mean-CaR models and a numerical example illustrating the results are presented. Some economic implications of the results are also examined.