



复旦大学数学科学学院

数学综合报告会

报告题目: Linear-Quadratic Optimal Control Problem for Mean-Field SDEs With Certain Random Coefficients

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时间: 2024-06-18 星期二 15:00-16:00

地点: 光华东主楼1601

报告摘要:

Motivated by linear-quadratic optimal control problems for mean-field SDEs with regime switching, we formulate an LQ problem governed by a standard Brownian motion, with the coefficients of the state equation and the weighting matrices/vectors being adapted to the filtration generated by the Markov chain independent of the Brownian motion governing the state equation. Through such a problem, we are going to approach our LQ problem in the following aspects: (i) Classical completing the squares gives a sufficient condition for the open-loop solvability of the LQ problem. However, this method is relevant to the optimality system (or Pontryagin's maximum principle), and therefore the optimal control could be anticipating which is not practical feasible. This leads to the following question: (ii) Does the optimal control admit a non-anticipating representation? Under certain conditions, we found a closed-loop representation of open-loop optimal control, which is non-anticipating. Then it is natural to ask whether such a representation is itself optimal within the class of closed-loop controls. This leads to the problem (iii) the closed-loop solvability of our LQ problem, a characterization of which results in the solvability of Riccati equation. Finally, both open-loop and closed-loop solvability will be implied by the uniform convexity of the cost functional in the control.

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