［様式－学 5］

主　論　文　要　旨

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論文題名　**The study on stochastic processes with reflecting barrier and itsapplication to the static hedging of exotic options**

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主論文要旨

This dissertation consists of four parts. The first part is taken from Akahori, Imamura and Yano (2009), in which the author, together with her collaborators, studied a finite time-horizon version of Madan-Roynette-Yor (MRY for short) formula. The finite time-horizon version can be understood in terms of static hedging of knock-out options. In the second part of the present dissertation, which is taken from Imamura (2010), the author discusses the relations among various static hedges implied both by the extended MRY formula and Carr-Chou's symmetric formula. The author showed two path transformations play a central role, that is, the Cameron-Martin transformation and the reflection principle. In the third part, which is taken from a preprint by Akahori, Imamura and Takagi, the author, together with her collaborators, further developed the relation between the static hedge and the two path transformations to multi-dimensional cases. The generalization involves notions coming from the classification of semi-simple Lie algebras, such as ``root systems” and ``Weyl chambers”. Actually, by using a generalized reflection principle applied to the Brownian motions in a Weyl chamber, the author derived a static hedging scheme for options with knock-out boundaries. The forth part, taken from a preprint by Imamura, Mikami and Watanabe, has a different flavor. It concerns with the study on some stochastic flows generated by non-strong solutions of SDE. Le Jan and Raimond (2004) constructed a stochastic process using the Dirichlet form approach. Therefore they assumed that the process necessarily be symmetric. Le Jan and Lemaire (2004) gave some sufficient condition under which the process is symmetric. The authors showed the condition is also necessary. Their stochastic flow is regarded as some particle system with collision. Thus it is an extension of the non-colliding Brownian motion. In that sense, it is related to the Brownian motion in a Weyl chamber.