

**Workshop in Stochastic Analysis and  
Applications**

- August, 2018 -

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**Method to Find a  $\epsilon$ -Optimal Control  
Non-Markovian Systems**

**Abstract**

We present a general solution for finding the epsilon-optimal controls for non-Markovian stochastic systems as stochastic differential equations driven by Brownian motion. Our theory provides a concrete description of a rather general class, among the principals, we can highlight financial problems such as portfolio control, hedging, super-hedging, pairs- trading and others. The pathwise analysis was made through a discretization structure proposed by Leão e Ohashi[1] jointly with measurable selection arguments, has provided us with a structure to transform an infinite dimensional problem into a finite dimensional. The theory is applied to stochastic control problems based on path-dependent SDEs where both drift and diffusion components are controlled. We are able to explicitly show optimal control with our method [2].

[1] Leão, D. and Ohashi, A. (2013). Weak approximations for Wiener functionals. Ann. Appl. Probab, 23, 4, 1660–1691

[2] Leão, D. Ohashi, A. and Souza, F. (2017). STOCHASTIC NEAR-OPTIMAL CONTROLS FOR PATHDEPENDENT SYSTEMS. arXiv: 1707.04976.