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General Pontryagin-type stochastic maximum principle and backward stochastic evolution equations in infinite dimensions. (English) [Zbl 1316.49004](#)

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The author presents yet another stochastic version of the Pontryagin maximum principle (see e.g. [*H. J. Kushner*, SIAM J. Control 10, 550–565 (1972; [Zbl 0242.93063](#))], [*U. G. Haussmann*, Stoch. Syst.: Model., Identif., Optim. II; Math. Program. Study 6, 30–48 (1976; [Zbl 0369.93048](#))], [*Y. Hu* and *S. Peng*, Stochastics Stochastics Rep. 33, No. 3–4, 159–180 (1990; [Zbl 0722.93080](#))]). In the book, a dynamical stochastic system is described by controlled stochastic evolution equations in which the control variables are present in the diffusion term. Moreover, the control domains may be nonconvex. By defining the so called relaxed transposition solution to the operator-valued backward stochastic evolution equations, the author is able to discuss well-posedness and regularity of such equations. It leads to some properties of the solution which in turn enable finding of necessary optimality conditions for controls in the case of convex control domains using convex perturbation techniques and finally in the case of general non-convex control domains using spline variation techniques. Unfortunately, the book is not endowed with any examples and therefore is very difficult to read.

Reviewer: [Andrzej Świerniak \(Gliwice\)](#)

MSC:

- [49-02](#) Research exposition (monographs, survey articles) pertaining to calculus of variations and optimal control
- [49K45](#) Optimality conditions for problems involving randomness
- [49J55](#) Existence of optimal solutions to problems involving randomness
- [60H10](#) Stochastic ordinary differential equations (aspects of stochastic analysis)
- [60H15](#) Stochastic partial differential equations (aspects of stochastic analysis)
- [93E20](#) Optimal stochastic control

Cited in **36** Documents

Keywords:

[Pontryagin-type stochastic maximum principle](#); [backward stochastic evolution equations](#)

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