Twardowska, Krystyna

An approximation theorem of Wong-Zakai type for nonlinear stochastic partial differential equations. (English) Zbl 0839.60059

Stochastic Anal. Appl. 13, No. 5, 601-626 (1995).

Summary: We present an extension of the Wong-Zakai approximation theorem for nonlinear stochastic partial differential equations defined in abstract spaces and with some Hilbert space valued disturbances given by the Wiener process and a martingale. By approximating these disturbances we obtain in the limit equation the Itô correction term for the infinite-dimensional case. Such form of the correction term connected with the Wiener process was proved in the author's papers [ibid. 10, No. 4, 471-500 (1992; Zbl 0754.60060) and Diss. Math. 325 (1993; Zbl 0777.60051)], where the approximation theorem for semilinear stochastic evolution equations in Hilbert spaces was studied. Our model here is similar as the one considered by *E. Pardoux* ["Equations aux dérivées partielles stochastiques non linéaires monotones. Etude de solutions fortes de type Itô" (Thèse, Univ. Paris Sud, 1975)].

MSC:

60H15 Stochastic partial differential equations (aspects of stochastic analysis)
60F15 Strong limit theorems

Keywords:

Wong-Zakai approximation theorem; stochastic evolution equations in Hilbert spaces

Full Text: DOI

References:

[1] DOI: 10.1080/07362998408809031 · Zbl 0547.60066 · doi:10.1080/07362998408809031
[2] Bensoussan A., pitman Research Notes in Math 268 pp 37– (1992)
[3] DOI: 10.1007/BF02761449 · Zbl 0241.35009 · doi:10.1007/BF02761449
[4] Brzéniak Z., Stochastics 24 pp 423– (1988) · Zbl 0653.60049 · doi:10.1080/17442508808833526
[5] DOI: 10.1007/BFb0006761 · doi:10.1007/BFb0006761
[6] DOI: 10.1016/0047-259X(75)90054-8 · Zbl 0299.60050 · doi:10.1016/0047-259X(75)90054-8
[7] Doss H., Ann. Inst.H. Poincaré 13 pp 99– (1977)
[8] Fleming W., Int. Symp. IRIA pp 179– (1975)
[9] Gyöngy I., Stochastics 7 pp 231– (1982)
[10] Gyöngy I., Theorems on supports pp 91– (1989) · Zbl 0683.93092
[11] Ikeda N., Stochastic Differential Equations and Diffusion Processes (1981) · Zbl 0495.60005
[12] Krylov N.U., Itogi Nauki i Techniki 14 pp 71– (1979)
[13] Lions J.L., Quelques Méthodes de Résolution de Problèmes aux Limites non Linéaires (1969)
[14] Mackevičius W., Lietuvos Matematikos Rinkinys 26 pp 91– (1986)
[15] DOI: 10.1007/BF00539856 · Zbl 0325.60054 · doi:10.1007/BF00539856
[16] Nakao, S. and Yamato, Y. Approximation theorem of stochastic differential equations. Proc.Internat.Sympos. SDE. 1976, Kyoto. pp.283–196. Tokyo
[17] Pardoux E., Etude de solutions fortes de type Itô (1975)
[18] Pardoux E., Stochastics 3 pp 127– (1979) · Zbl 0424.60067 · doi:10.1080/17442507908833142
[19] Rozovskii B.L., Linear Theory and Applications to Non- linear Filtering (1990)
[20] Tanabe H., Monographs andStudies in Math 6 (1979)
[21] DOI: 10.1080/07362999208809284 · Zbl 0754.60060 · doi:10.1080/07362999208809284
[22] Twardowska K., Dissertationes Math 325 pp 1– (1993)
[23] DOI: 10.1214/aoms/1177699916 · Zbl 0138.11201 · doi:10.1214/aoms/1177699916