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Book of Abstracts

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ber (equal to $n^m \times m^n$) of the bimatrix subgames in the non extended strategies are to be solved.

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Limit theorems for stochastic equations involving local time of process

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It is well known that convergence of coefficients of Ito stochastic equation is not sufficient for weak convergence of solutions of stochastic equation. It is necessary additional condition.

We consider weak convergence of solutions of stochastic equations involving local time with nonregular dependence of the coefficients on small parameter ε:

$$\xi_\varepsilon(t) = x + \beta_\varepsilon L^{\xi_\varepsilon}(t,0) + \int_0^t \big(b_\varepsilon(\xi_\varepsilon(s)) + g_\varepsilon(\xi_\varepsilon(s))\big)ds +$$

$$+ \int_0^t \sigma_\varepsilon(\xi_\varepsilon(s))dw(s). \qquad (1)$$

A stochastic equation involving local time was first investigated in [1] and [2]. Moreover in [2], [3], [4] were obtained formulae which connect solutions of stochastic equations with local time with solutions of Ito's stochastic equations.

We suppose that the coefficients of stochastic equation (1) satisfy following conditions: $\beta_\varepsilon \to \beta$ when $\varepsilon \to 0$, $|\beta_\varepsilon| < 1$ and $|\beta| < 1$, there exists a constant $\Lambda > 0$ such that $|g_\varepsilon(x)| < \Lambda$, $\frac{1}{\Lambda} < \sigma_\varepsilon^2(x) < \Lambda$ and for every $x \in \mathbb{R}$

$$\left| \int_0^x \frac{b_\varepsilon(y)}{\sigma_\varepsilon^2(y)} dy \right| \le \Lambda \, .$$

Denote by $\xi(t)$ a weak solution following stochastic equation involving a local time (with $|\gamma| < 1$)

$$\xi(t) = x + \gamma L^\xi(t,0) + \int_0^t g(\xi(s))ds + \int_0^t \sigma(\xi(s))dw(s). \tag{2}$$

Let $(\mathbb{C}[0,T], C_t), t \in [0,T]$ be a space of continuous functions on interval $[0,T]$. Let us denote as μ_ε and as μ the measures on functional space $(\mathbb{C}[0,T], C_t)$ generated by processes the $\xi_\varepsilon(t)$ and $\xi(t)$ respectively.

Theorem. *The necessary and sufficient conditions for the weak convergence of solutions of stochastic equations (1) to solution of stochastic equation (2) are obtained.*

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Perturbed homogeneous linear recurrent systems

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Let $a \in Rol[\mathbb{R}]$, $m = dim[\mathbb{R}](a)$ and $Q(z) = H_m^{[q]}(z) \in H[\mathbb{R}][m](a)$. From [2], a converges to L if and only if, for each root z_k of $Q(z)$, $|z_k| > 1$ or $z_k = 1$ is a simple root. If $Q(1) \neq 0$, then $L = 0$. Instead, if $Q(1) = 0$, we have $L \neq 0$ and L can be calculated, without knowing the roots of $Q(z)$, by transforming a into a $m-1$ linear recurrence with a constant inhomogeneity.

If $\exists z_k$ such that $|z_k| < 1$ or z_k is a multiple root with $|z_k| = 1$, then a diverges to infinity. Instead, if $\forall z_k$ is a simple root of unity, then a is periodic. When $\forall z_k$ is a simple root of unity or $|z_k| > 1$, then a is bounded.

The Jury Stability Criterion ([3]) can be applied for studying the localization of the roots of reciprocal polynomial $Q^*(z)$ in relation to unit circle, without finding the roots. We need to have at least $Q(1) > 0$, $Q(-1) > 0$ and $|q_{m-1}| < 1$ in order all the roots of $Q(z)$ to lie outside of unit disc. For instance, based on [1], this does not happen when $Q(z) \in \mathbb{Z}[z]$. Instead, the homogeneous linear recurrent distributions (including the distributions of stochastic systems with final sequence of states [2]) satisfy this property.