The theorem on the continuous dependence on a parameter of the solutions of a class of stochastic integral equations with random coefficients containing as summands along with a Lebesgue integral, two-parameter stochastic integrals with respect to a Wiener and a centered Poisson measure is proved.

We consider a stochastic integral equation for vector random field \( \xi(t_1, t_2) \) of two real arguments \((t_1, t_2)\) (with values in \( \mathbb{R}^d \)) having the form

\[
\xi(t) = \psi(t_2) - \xi_0 + \int_{0}^{t} a(s, \xi(s)) \, ds_1 \, ds_2 + \int_{0}^{t} B(s, \xi(s)) \, dw_1 \, ds_2 + \int_{0}^{t} C(s, \xi(s), \theta) \, d\nu(\theta, ds_1, ds_2, d\theta),
\]

where \( \psi(t_2) = \psi(0, t_2), \psi(0) = \psi(0, 0) \), \( \xi(0) = \xi_0 \), \( a(t, x) = a(t, x, t_1, t_2) \), \( B(t, x) = B(t, x, t_1, t_2) \), \( C(t, x, \theta) = C(t, x, \theta, t_1, t_2) \) being random functions defined on \( \Omega \times \mathcal{D}_0 \times \mathbb{R}^d \), \( \Omega \times \mathcal{D}_0 \times \mathbb{R}^d \times \Theta \), \( \mathcal{D}_0 = [0, 1]^2 = [0, 1] \times [0, 1]; \Theta = R \setminus \{0\} \) and assuming values in \( \mathbb{R}^d \), \( L(\mathbb{R}^d), \mathbb{R}^d \) respectively; \( w(t) = w(t_1, t_2), t_1 \geq 0, t_2 \geq 0 \) being a two-parameter Wiener field with values in \( \mathbb{R}^d \); \( \tilde{w}(0, t_1, A) \) being a centered Poisson measure on \( \mathcal{D}_0 \times \Theta \) for which \( M^2(\tilde{w}(0, t_1, A)) = [0, 1] \times (0, t_1] \) is the area of the rectangle \( (0, t_1] \times (0, t_2] \); \( \Pi(A) \) being a \( \sigma \)-finite measure on the \( \sigma \)-algebra of Borel sets of the space \( \Theta \). The Wiener field \( w(t) \) and the centered Poisson measure \( \tilde{w}(0, t_1, A) \) are mutually independent.

The first integral in (1) is understood as a Lebesgue integral, the second and third as two-parameter stochastic integrals.

We assume that the Wiener field \( w(t) \) and centered Poisson measure \( \tilde{w}(0, t_1, A) \) the stochastic processes \( \psi(u), \psi(u), \varphi(u), u \in [0, 1] \), and the family of random functions \( a(t, x), B(t, x), C(t, x, \theta) \) are defined on a probability space \( \{\Omega, \mathcal{F}, P\} \) with flow of \( \sigma \)-algebras \( \{\mathcal{F}_t\} \), \( t \in \mathcal{D}_0 \), with which \( w(t) \) and \( \tilde{w}(0, t_1, A) \) are compatible. The random functions \( \psi(t_1), \psi(t_2) \) are subordinate to the flows of \( \sigma \)-algebras \( \{\mathcal{F}_{t_1,0}\}, t_1 \geq 0 \) and \( \{\mathcal{F}_{0,t_2}\}, t_2 \geq 0 \) respectively. Also let \( w(t', t) \) and \( \tilde{w}(t', t_1, A) \) \( t' \leq t \) be independent of the \( \sigma \)-algebra \( \mathcal{F}_t \) and \( \mathcal{F}_{t_1} \) respectively. (We recall that for an arbitrary function \( f(t) \) in its domain of definition for \( t' \leq t \) \( f(t', t_1, t_2) = f(t_1, t_2) + f(t_1, t_2', t_1') + f(t_1', t_2') \).

We denote by \( D^2(\mathcal{D}_0) = D_2(\mathcal{D}_0, \mathbb{R}^d) \) the space of fields without discontinuities of the second kind, by \( \mathcal{B} \) the Borel \( \sigma \)-algebra of sets from \( \mathcal{D}_0 \times \mathbb{R}^d \), and by \( \mathcal{B}^\mathcal{F} \) the Borel \( \sigma \)-algebra of sets from \( \mathcal{D}_0 \times \mathbb{R}^d \times \Theta \).

We introduce the following conditions on the coefficients of (1):

**C1.** The functions \( a(t, x) \) and \( B(t, x) \) are measurable with respect to \( \mathcal{F}_t \times \mathcal{B} \), and \( C(t, x, \theta) \) with respect to \( \mathcal{F}_t \times \mathcal{B}^\mathcal{F} \), and in the collection \( \omega, t \) they are \( \mathcal{F} \)-measurable where \( \mathcal{F} \) is the predicted \( \sigma \)-algebra with respect to the flow \( \{\mathcal{F}_t\}, t \in \mathcal{D}_0 \).

**C2.** There is a nonrandom constant \( L_1 \) such that for \( t \in \mathcal{D}_0 \) with probability 1 the following inequality holds:

\[
|a(t, x)|^p + \|B(t, x)\|_p + \left(\int_0^t \|C(t, x, \theta)\|^p \, d\theta\right) \leq L_1 (1 + |x|^p).
\]

**C3.** There is a nonrandom constant \( L_2 \) such that for \( t \in \mathcal{D}_0, x, y \in \mathbb{R}^d \) with probability 1 one has
\[ |a(t, x) - a(t, y)|^2 + |B(t, x) - B(t, y)|^2 + \int_\mathbb{R} |C(t, x, \theta)|^2 \leq L_x |x - y|^2. \]

We consider an equation somewhat more general than (1), namely an equation of the form

\[ \xi(t) = \chi(t) + \int_0^t a(s, \xi(s)) \, ds + \int_0^t B(s, \xi(s)) \, \nu(ds_1, ds_2) + \int_0^t C(s, \xi(s), \theta) \, \nu(ds_1, ds_2, d\theta). \]

**THEOREM 1.** Let us assume that the coefficients \(a(t, x), B(t, x), C(t, x, \theta)\) satisfy conditions C1-C3, the function \(x(t)\) is compatible with the flow \(\{\mathcal{S}_t\}\), \(t \in \mathcal{D}_0\),

\[ M \sup_{t \in \mathcal{D}_0} |\chi(t)|^2 \leq \infty \]

and the realizations of \(\chi(t)\) a.s. belong to \(D_\mathcal{D}(\mathcal{D}_0, \mathbb{R}^d)\). Then (2) has a solution \(\xi(t)\) which is compatible with the flow \(\{\mathcal{S}_t\}\), is unique a.s., has no discontinuities of the second kind, and \(M \sup_{t \in \mathcal{D}_0} |\xi(t)|^2 \leq \infty\).

The proof of Theorem 1 goes according to the same scheme and with the help of the same methods as the proof of Theorem 1 of [2] so we omit it. We note only that for the last two integrals in (2) it is easy to get the following estimates:

\[ M \left\{ \int_0^t \int_{\mathcal{D}_0} B(s, \xi(s)) \, \nu(ds_1, ds_2) \right\}^2 \leq 16M \left\{ \int_0^t \sup_{s, \mathcal{D}_0} B(s, \xi(s)) \right\}^2 \mu(ds_1, ds_2) \]

\[ M \left\{ \int_0^t \int_{\mathcal{D}_0} C(s, \xi(s), \theta) \, \nu(ds_1, ds_2, d\theta) \right\}^2 \leq 16M \left\{ \int_0^t \int_{\mathcal{D}_0} C(s, \xi(s), \theta) \, \nu(ds_1, ds_2, d\theta) \right\}^2 \mu(ds_1, ds_2). \]

Analogously to the one-parameter case (cf. [3], Theorem 2, p. 236) one can show that under identical boundary conditions the solutions of the two different equations agree on the set on which their coefficients agree.

**LEMMA 1.** Let \(\xi(t)\) be a solution of (2) and \(\tilde{\xi}(t)\) be a solution of the equation

\[ \tilde{\xi}(t) = \chi(t) + \int_0^t a(s, \tilde{\xi}(s)) \, ds + \int_0^t B(s, \tilde{\xi}(s)) \, \nu(ds_1, ds_2) + \int_0^t C(s, \tilde{\xi}(s), \theta) \, \nu(ds_1, ds_2, d\theta). \]

If the hypotheses of Theorem 1 hold (i.e., a solution of an equation of the form (2) exists and is unique) and \(a(t, x) = \bar{a}(t, x), B(t, x) = \bar{B}(t, x)\)

\[ C(t, x, \theta) = \bar{C}(t, x, \theta) \quad \text{a.s. for} \quad |x| \leq N, \text{ then } \xi(t) = \tilde{\xi}(t) \]

for \(t \in ((0, 0), (\tau, \tau)] \) where \(\tau = \inf \{\tau \leq 1 : \max_{t, \mathcal{D}_0} |\xi(t)| \geq N\}. \)

We give a lemma which is an analog of Gronwall’s lemma (cf., e.g., [1]).

**LEMMA 2.** If \(z(t)\) is a nonnegative integrable function on \(\mathcal{D}_0\) and

\[ z(t) \leq A + B \int_0^t z(s) \, ds_1, ds_2, B, A > 0, \]

then

\[ z(t) \leq Ae^{Bt}, \]

**COROLLARY 1.** Let the hypotheses of Theorem 1 hold but instead of the compatibility of the function \(\chi(t)\) with the flow of \(\sigma\)-algebras \(\{\mathcal{F}_t\}\), \(t \in \mathcal{D}_0\) we require its compatibility with the flow of \(\sigma\)-algebras \(\gamma_t = \gamma_{t, (0)} = \mathcal{F}_{(0, \theta)} \vee 2\mathcal{D}_0, \theta\).

Then there exists a positive nonrandom function \(g(t)\) and a constant \(k\) (depending only on \(L_x\)) such that