Errata to the paper: Existence and stability results for semilinear systems of impulsive stochastic differential equations with fractional Brownian motion. Stoch. Anal. Appl. 34 (2016), no. 5, 792-834.

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Abstract

In this paper we correct an error made in our paper [Blouhi, T.; Caraballo, T.; Ouahab, A. Existence and stability results for semilinear systems of impulsive stochastic differential equations with fractional Brownian motion. Stoch. Anal. Appl. 34 (2016), no. 5, 792-834]. In fact, in this corrigendum we present the correct hypotheses and results, and highlight that the results can be proved using the same method used in the original work. The main feature is that we used a result which has been proved only when the diffusion term does not depend on the unknown.

Key words and phrases: Stochastic difference equations, Matrix convergent, Generalized Banach space, Fixed point.
AMS (MOS) Subject Classifications: 34A37,60H99,47H10.

1 Introduction

In our paper [1] we analyzed the existence and stability of solutions of the following problem:

$$\begin{cases} dx(t) &=& (Ax(t)+f^1(t,x(t),y(t)))dt+\displaystyle\sum_{l=1}^{\infty}\sigma_l^1(t,x(t)),y(t))dB_l^H(t),\ t\in J:=[0,b],t\neq t_k,\\ dy(t) &=& (Ay(t)+f^2(t,x(t),y(t)))dt+\displaystyle\sum_{l=1}^{\infty}\sigma_l^2(t,x(t),y(t))dB_l^H(t),\ t\in[0,b],t\neq t_k,\\ \Delta x(t) &=& I_k(x(t_k)),\quad t=t_k\quad k=1,2,\dots,m\\ \Delta y(t) &=& \overline{I}_k(y(t_k)),\\ x(0) &=& x_0,\\ y(0) &=& y_0. \end{cases} \tag{1.1}$$

However, in order to apply Lemma 2.3 in [1], the functions σ_l^1 and σ_l^2 can only depend on the time t. For this reason, the correct form of our problem in [1] should be

$$\begin{cases} dx(t) &=& (Ax(t)+f^1(t,x(t),y(t)))dt+\displaystyle\sum_{l=1}^{\infty}\sigma_l^1(t)dB_l^H(t),\ t\in J:=[0,b],t\neq t_k,\\ dy(t) &=& (Ay(t)+f^2(t,x(t),y(t)))dt+\displaystyle\sum_{l=1}^{\infty}\sigma_l^2(t)dB_l^H(t),\ t\in[0,b],t\neq t_k,\\ \Delta x(t) &=& I_k(x(t_k)),\quad t=t_k\quad k=1,2,\dots,m\\ \Delta y(t) &=& \overline{I}_k(y(t_k)),\\ x(0) &=& x_0,\\ y(0) &=& y_0, \end{cases} \tag{1.2}$$

where $J:=[0,T]$, X is a real separable Hilbert space with inner product $\langle\cdot,\cdot\rangle$ induced by norm $\|\cdot\|$, $A: D(A)\subset X\longrightarrow X$ is the infinitesimal generator of a strongly continuous semigroup of bounded linear operators $(S(t))_{t\geq 0}$ in X, $f^1,f^2:[0,b]\times X\times X\longrightarrow X$, $I_k\in C(X,X)$ $(k=1,2,\dots,m)$ and $\sigma_l^1,\sigma_l^2: J\to L_Q^0(Y,X)$. Here, $L_Q^0(Y,X)$ denotes the space of all Q-Hilbert-Schmidt operators from Y into X (see [1] for the definition of this space). Moreover, the fixed times t_k satisfy $0<t_1<t_2<\ldots<t_m<$

T, $y(t_k^-)$ and $y(t_k^+)$ denote the left and right limits of $y(t)$ at $t = t_k$,

$$\begin{cases} \sigma(.) = (\sigma_1(.), \sigma_2(.), \ldots), \\ \|\sigma(.)\|^2 = \sum_{l=1}^{\infty} \|\sigma_l(.)\|^2_{L_Q^0} < \infty \end{cases} \tag{1.3}$$

with $\sigma(.) \in \ell^2$, where

$$\ell^2 = \{\phi = (\phi_l)_{l \geq 1} : J \to L_Q^0(Y, X) \quad : \|\phi(t)\|^2 = \sum_{l=1}^{\infty} \|\phi_l(t)\|^2_{L_Q^0} < \infty\}.$$

Now, we present the revisions of the statement of the results in our original paper [1].

Theorem 1.1. *(Corrected form of Theorem 4.1 in [1]) Assume that* $(H1)$ *holds. Then, problem (1.2) possesses a unique mild solution on* $[0, T]$.

Proof. We use the same method of original paper only we removed the part of σ_1 in the proof of theorem 4.1 in the original paper. □

We now state the corrected version of Theorem 4.2 in [1].

Theorem 1.2. *(Corrected form of Theorem 4.2 in [1]). Assume conditions* $(H3), (H5)-(H7)$ *hold. Then, problem (1.2) has at least one solution.*

Proof. We use the same method of original paper. □

Remark 1.1. *Along our original paper [1], problem (1.1) must be replaced by (1.2) and the assumptions imposed on* σ_1, σ_2 *must be the ones stated in the current paper.*

References

[1] T. Blouhi, T. Caraballo, and A. Ouahab. Existence and stability results for semilinear systems of impulsive stochastic differential equations with fractional Brownian motion. *Stoch. Anal. Appl.*, 34(5):792–834, 2016.