Kelbert, M.; **Orsingher, E.**

On a telegraph-type equation with non-constant coefficients emerging in randomly accelerated motions. (English. Russian original) Zbl 0917.35068

Probl. Inf. Transm. 30, No. 2, 177-182 (1994); translation from Probl. Peredachi Inf. 30, No. 99-103 (1994).

Summary: We analyze the random motion of a particle whose acceleration is the two-valued telegraph process $\{A(t), t \geq 0\}$. We derive the third-order, hyperbolic partial differential equation governing the probability law $p = p(x, v, t)$ of the Markov vector-valued process $\{V(t), X(t), t \geq 0\}$ (V is obtained by integrating the two-valued telegraph process and $x(t) = \int_0^t V(s)ds$ is analyzed). In particular, solutions of the form $p(x, v, t) = e^{-2\lambda t} q(x - vt, t^2/2)$ are taken into account. The general solution (in terms of the double-Fourier transform) of the equation governing q is presented, and some of its properties investigated.

MSC:

35L25 Higher-order hyperbolic equations

Keywords:

third-order, hyperbolic partial differential equation; Markov vector-valued process; double-Fourier transform