Zotova E. I. (UUST, Ufa, Russia). **On stochastic and deterministic Korteweg-de Vries-Burgers equations**

Let a random process $V(t)$, $t \in [0,T]$, be given with almost surely continuous trajectories. We study two problems for stochastic Korteweg-de Vries-Burgers (KdV-B) equations with a symmetric integral [1] with respect to the process $V(t)$, which have the form

$$u(x,t) - \varphi(x) + \int_0^t [f_x(u(x,s)) - u_{xx}(x,s) + u_{xxx}(x,s)]\, ds = \int_0^t u_x(x,s) * dV(s), \quad (1)$$

$$u(x,t) - \varphi(x) + \int_0^t [f_x(u(x,s)) - u_{xx}(x,s)]\, ds = -\int_0^t u_{xxx}(x,s) * dV(s), \quad (2)$$

where $f(u) = \frac{u^2}{2}$. If $V(t)$ is a smooth deterministic function, then problems (1) and (2) can be written as

$$u_t + uu_x + u_{xxx} = u_{xx} + u_x V'(t), \quad u(x,0) = \varphi(x),$$

$$u_t + uu_x + u_{xxx} V'(t) = u_{xx}, \quad u(x,0) = \varphi(x).$$

Theorem. *Let the function $F(z(x,V(t)),t)$, $z(x,V(t)) = x - V(t)$, be a solution to the following problem*

$$F_t + FF_z + F_{zzz} = F_{zz}, \quad F(z(x,0),0) = \varphi(x).$$

Then the function $u(x,t) = F(z(x,V(t)),t)$ is a solution to the Cauchy problem for the stochastic KdV-B equation with additive noise (1).

For the stochastic equation (2), a numerical-analytical method for constructing approximate solutions is presented, based on the solution of the Cauchy problem for the stochastic Burgers equation [2].

REFERENCES

[1] F.S. Nasyrov, *Local Times, Symmetric Integrals, and Stochastic Analysis*, Fizmatlit, Moscow, 2011 (in Russian).

[2] Zotova E. I., Nasyrov F. S., *On the Cauchy problem for stochastic and deterministic generalized Burgers equations* // Siberian Mathematical Journal, 2026,Vol.67, No.1, pp.74–80.