

**Alekseeva U. A.** (Ekaterinburg, Russia) — **On a connection between a Brownian sheet and a  $Q$ -Wiener and a cylindrical Wiener processes.**

The problem of small transverse oscillations of a string under the influence of external random impulses is under consideration. It is demonstrated that a process describing external influences is a Brownian sheet  $\{W(t, x), t \geq 0, x \in [0, l]\}$ , that means it is a Gaussian random two-parameter function with zero mean and with  $\text{Cov}(W(t_1, x_1), W(t_2, x_2)) = \min\{t_1, t_2\} \cdot \min\{x_1, x_2\}$  [1]. It is proved that the Brownian sheet is a  $Q$ -Wiener process in  $H = L_2[0, l]$  with  $(Qh)(x) = \int_0^l K(x, y)h(y) dy$ , where  $K(x, y) = \min\{x, y\}$ , and that its derivative  $\frac{\partial W(t, x)}{\partial x}$  is a cylindrical Wiener process in  $H$  [2,3]. The problem of oscillations leads to the stochastic equation

$$u_t(t, x) - g(x) = a \int_0^t \frac{\partial^2 u(\tau, x)}{\partial x^2} d\tau + b \frac{\partial W(t, x)}{\partial x}.$$

The existence of a strong and a weak solutions of this equation in  $H$  is discussed in the talk.

#### REFERENCES

1. *Alekseeva U.A.* On the definition of a Brownian sheet. Trudy IMM UrO RAN, 2018, Vol. 24, no. 2.
2. *Da Prato G., Zabczyk J.* Stochastic equations in infinite dimensions. Cambridge Univ. Press, 2014. 380 p.
3. *Melnikova I.V.* Modeling abstract stochastic problems with white noise perturbations. In "Trends in Mathematics Research Perspectives, 2018 (to appear).