Filichkina E. (Lomonosov Moscow State University, Moscow, Russia). **Conditions for the growth of particle numbers for various configurations of branching sources in branching random walks on an integer line.** Let us consider a branching random walk (BRW) in an absorbing environment with one particle generation center (see, for example, [1]). For BRW on $\mathbb{Z}$ with $2n$ absorbing sources located symmetrically around the generation center necessary and sufficient conditions for exponential growth of particle numbers at every point are obtained. Let β be the intensity of the particle branching source, b_0 — the intensity of absorption, and $\varkappa > 0$ — coefficient in front of the difference Laplacian specifying a simple random walk.

THEOREM. *Condition*

$$\beta > \frac{\varkappa(c_1\lambda_1^n + c_2\lambda_2^n) - \frac{\varkappa^2}{2b_0}(c_1\lambda_1^{n-1} + c_2\lambda_2^{n-1})}{c_1\lambda_1^n + c_2\lambda_2^n}$$

is a necessary and sufficient for the existence of an isolated positive eigenvalue for the evolution operator of average particle numbers, which ensures an exponential increase in the particle numbers. Here $\lambda_{1,2}$ *are the roots of the equation* $\lambda^2 - (1 + \varkappa/b_0)\,\lambda + \varkappa^2/4b_0^2 = 0$, *and* c_1, c_2 *are found from the ratios:* $1 + \varkappa/2b_0 = c_1\lambda_1 + c_2\lambda_2$ *and* $1 + 3\varkappa/2b_0 + 3\varkappa^2/4b_0^2 = c_1\lambda_1^2 + c_2\lambda_2^2$.

REFERENCES

[1] Filichkina E., Yarovaya E., “Branching Random Walks with One Particle Generation Center and Possible Absorption at Every Point”, Mathematics (2023), 11, 1676.