

A currently intensively researched area of physics is Active Brownian ratchets, devices capable of directing the motion of particles by utilizing their activity. In the bachelor thesis, we proposed a ratchet operating only due to the spatial dependence of the particle velocity, and thus without the use of periodic potentials or walls. We verified its functionality using two mutually independent numerical methods. Our main result is the dependence of the particle probability flux on parameters describing the relative influence of activity and diffusion on particle motion. Using the mean value of the particle orientation, we have illustrated its behaviour in the ratchet. This allowed us to reveal how the ratchet works.