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Random Walk on a Triangular Lattice with Time-Varying Transition Rates

Abstract

Many processes vary periodically with time. Some examples include: the level of water in the Great Lakes, the amount of a pollutant in the air, the volume of calls to a call center, the emergency service demands, the number of airplanes arriving and departing from an airport, and many, many others. In this talk, we consider a random walk which travels in the direction of the third roots of unity on a triangular lattice in a region of the plane. We consider general time-varying transition rates and also those rates which vary periodically with time. We obtain the transient distribution for the location of the walk in the plane at time t . When rates are periodic and the system is ergodic, we obtain an asymptotic (in time) periodic distribution for the location in the plane. We show that under certain conditions, the distribution is asymptotically geometric (in the distance from the origin) and provide numerical examples.