Capstone Project topic: **Extending the transition probability of one-particle TASEP on $\mathbb{Z}$ with inhomogeneous rates to $\mathbb{Z}^2$**

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Suppose that a particle on $\mathbb{Z}$ waits an exponential random time with a rate depending on sites and then jumps to the right by 1. If this particle starts at y at $t = 0$, what is the probability that this particle is at x at time $t > 0$? Now, consider an particle on $\mathbb{Z}^2$. This particle waits an exponential random time with a rate depending on sites and then jump to the right by 1 with probability p or upward by 1 with probability $q = 1 - p$. If this particle start at $y \in \mathbb{Z}^2$, what is the probability that this particle is at $x \in \mathbb{Z}$ at time > 0?

Pre-requisites: Strong background in Differential Equations, Probability, Stochastic Processes, Complex Analysis