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ON PLANAR BROWNIAN MOTION SINGULARLY TILTED
THROUGH A POINT POTENTIAL

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Abstract

We will discuss a special family of two-dimensional diffusions, defined over a finite time interval $[0, T]$. These diffusions have transition density functions that are given by the integral kernels of the semigroup corresponding to the two-dimensional Schrödinger operator with a point potential at the origin. Although, in a few ways, our processes of interest are closely related to two-dimensional Brownian motion, they have a singular drift pointing in the direction of the origin that is strong enough to enable the possibility of visiting there with positive probability. Our main focus is on characterizing a local time process at the origin for these diffusions analogous to that for a one-dimensional Brownian motion.