ESTIMATES OF THE TRANSITION DENSITIES FOR THE REFLECTED BROWNIAN MOTION ON SIMPLE NESTED FRACTALS

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We give sharp two-sided estimates of the transition probability densities for the Brownian motion on a M-complex of size $M \in \mathbb{Z}$ for a class of planar simple nested fractals.

Theorem 1. The transition probability densities $g_M(t, x, y)$ for the Brownian motion reflecting in the vertices of an M-complex satisfy the following inequalities

$$c_1\left(f_{c_2}(t,|x-y|) \lor h_{c_3}(t,M)\right) \le g_M(t,x,y) \le c_4\left(f_{c_5}(t,|x-y|) \lor h_{c_6}(t,M)\right),$$

where

$$f_c(t,r) = t^{-d_s/2} \exp\left(-c\left(\frac{r^{d_w}}{t}\right)^{1/(d_J-1)}\right)$$
$$h_c(t,M) = L^{-d_fM} \left(\frac{L^M}{t^{1/d_w}} \vee 1\right)^{d_f - d_w/(d_J-1)} \exp\left(-c\left(\frac{L^M}{t^{1/d_w}} \vee 1\right)^{d_w/(d_J-1)}\right)$$

and constants $c_1, ..., c_6$ do not depend on t, x, y or M.