Minisymposium 24 - Probability and Geometry

One dimensional diffusions conditioned to be non-explosive

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We consider one dimensional diffusions conditioned to be non-explosive. Suppose we are given a minimal diffusion process $\{X_t, P_x\}$ on an interval (l_1, l_2). Let ζ be its explosion time. If $P_x[\zeta = \infty] > 0$, then the measure conditioned to be non-explosive is defined by

$$P_x[\,\cdot\,|\,\zeta = \infty] = P_x[\,\cdot\,\cap\zeta = \infty]/P_x[\zeta = \infty].$$

If $P_x[\zeta = \infty] = 0$, then the measure conditioned to be non-explosive is defined as the limit

$$\lim_{T\to\infty} P_x[\,\cdot\,|\,\zeta > T].$$

If the limit exists and the limit is a diffusion process, we call it a *surviving diffusion*. We are interested in the following problems:

(1) When does the surviving diffusion exist?
(2) Characterization of the surviving diffusion.

The surviving diffusion is characterized as a h-transform of the original process by the λ-harmonic function φ, λ being the principal eigenvalue.