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Stochastic Processes in Vision I: From Langevin to Beltrami

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Abstract

Diffusion processes which are widely used in low level vision are presented as a result of an underlying stochastic process. Non-linear diffusion is interpreted as a Fokker-Planck equation which governs the evolution in time of a probability distribution for a Brownian motion on a Riemannian surface. The non linearity of the diffusion has a direct relation to the geometry of the surface. A short time kernel to the diffusion as well as generalizations are found.