M. Sango

Dept. of Mathematics, University of Pretoria, Pretoria 0002, South Africa
`mamadou.sango@up.ac.za`

Heat Flow for Closed Geodesics on Finsler Manifolds

We use the celebrated heat flow method of Eells and Sampson to the question of deformation of a smooth loop $M \in \mathbf{R}^2$ on a Finsler manifold (N, h) to a closed geodesic in N. This leads to the investigation of the corresponding heat equation which is the parabolic initial value problem

$$
\frac{\partial u^i}{\partial t} - \frac{\partial^2 u^i}{\partial x^2} \;=\; \Gamma^i_{hk}\left(u, \frac{\partial u}{\partial x}\right) \frac{\partial u^h}{\partial x} \frac{\partial u^k}{\partial x} \text{ in } M \times [0, T),
$$

$$
u(x, 0) \;=\; f(x); \; i = 1, ..., n.
$$

The existence of a global in time solution $u(x, t)$ and its subsequent convergence to a closed geodesic $u_\infty \colon M \to N$ as $t \to \infty$, are dealt with. Appropriate concepts arising from the Finslerian nature of the problem are introduced.