REGULARITY THEORY AND ASYMPTOTIC BEHAVIORS IN INTEGRO-DIFFERENTIAL OPERATORS

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In this talk, we consider the asymptotic behavior of nonlocal flows $u_t + (-\triangle)^{\frac{1}{2}} u = 0$ to find the geometric property of the solutions in nonlinear eigenvalue problem:

$$(-\triangle)^{\frac{1}{2}} \varphi = \lambda \varphi$$

posed in a strictly convex domain $\Omega \subset \mathbb{R}^n$ with $\varphi > 0$ in Ω and $\varphi = 0$ on $\mathbb{R}^n \backslash \Omega$. This corresponds to an eigenvalue problem for Cauchy process. The concavity of φ is well known for the dimension $n = 1$. In this talk, we will show $\varphi^{-\frac{2}{n+1}}$ is convex. Moreover, the eventual power-convexity of the parabolic flows is also proved. We extend geometric results to Cauchy problem for the fractional heat operator.

References

[1] Sunghoon Kim, Ki-Ahm Lee *Hölder estimates for singular non-local parabolic equations,* J. Functional Analysis 261 (2011) 3482-3518

[2] Sunghoon Kim, Ki-Ahm Lee *Geometric property of the Ground State Eigenfunction for Cauchy Process* , http://arxiv.org/abs/1105.3283

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