Fractional Powers of Parabolic Operators and Master Equation

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Abstract: In this talk we will define the fractional power of parabolic operator. Using Fourier Transform, we get a definition of the fractional power of the heat operator, i.e $(\partial_t - \Delta)^s$ for $0 < s < 1$. Then the following integral representation of Gamma function,

$$\Gamma(-s) = \int_0^\infty \left(e^{-t} - 1\right) \frac{dt}{t^{1+s}},$$

and its analytic continuation in the complex Right Half Plane with Cauchy Integral formula gives a Semi-group formulation of the fractional power of $(\partial_t - \Delta)^s$. This also gives us a point-wise formula for $(\partial_t - \Delta)^s u$. Then we will give the Harnack inequality for the operator $(\partial_t - \Delta)^s$. Finally we will talk about the fractional power of the operator $(\partial_t + L)$, where L is an elliptic operator in divergence form and the corresponding Harnack inequality.

Time: Friday, April 12, 2019, 1:30-2:30pm
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