Auburn Montgomery

Department of Mathematics

Colloquium/$\mathcal{MAMS}$

Time: Friday, August 23, 2013, 2:00pm–3:00pm

Place: Auburn Montgomery, Goodwyn Hall, Room 202

Speaker: Professor Der-Chen Chang, Georgetown University

Title: Heat kernels for a family of subelliptic operators

Abstract: : We construct the heat kernel for the second-order operator $\Delta_X = \frac{1}{2}\sum_{k=1}^{n}\left(\frac{\partial}{\partial x_k}\right)^2 + \frac{1}{2}\sum_{k=1}^{n}\left(x_k^2\frac{\partial}{\partial y_k}\right)^2$, which is a degenerate elliptic operator. Obviously, this operator is closely related to the Grushin operator $L_G = \frac{1}{2}\left(\frac{\partial}{\partial x}\right)^2 + \frac{1}{2}\left(x^2\frac{\partial}{\partial y}\right)^2$. In this talk, we first study the geometry induced by the operator L_G. Given any two points in the space, the number of geodesics and the lengths of the geodesics are calculated. Then we find modified complex action functions and show that the critical values of this function will recover the lengths of the corresponding geodesics. We also find the volume element by solving a generalized transport equation. Finally, the formula for the heat kernel of the diffusion operator $\frac{\partial}{\partial t} - \Delta_X$ is obtained. We also discuss asymptotic behavior of these kernels.

There is also a Math Club social gathering starting at 1:30pm.
****Refreshments will be served at 1:30pm****

This event is supported by the AUM Lecturer's Program.