

Asymptotic behavior of solutions for some diffusion problems on metric graphs

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In this talk we present some recent result about the long time behavior of the solutions for some diffusion processes on a metric graph. We study evolution problems on a metric connected finite graph in which some of the edges have infinity length. We show that the asymptotic behaviour of the solutions of the heat equation (or even some nonlocal diffusion problems) is given by the solution of the heat equation, but on a star shaped graph in which there is only one node and as many infinite edges as in the original graph. In this way we obtain that the compact component that consists in all the vertices and all the edges of finite length can be reduced to a single point when looking at the asymptotic behaviour of the solutions. We prove that when time is large the solution behaves like a gaussian profile on the infinite edges. When the nonlinear convective part is present we obtain similar results but only on a star shaped tree.

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