# On weakly singular kernels arising in equations set on a graph, modelling a flow in a networtk of thin tubes

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This talk follows the talk by Frédéric Chardard entitled: Numerical solution of the viscous flows in a network of thin tubes: equations on the graph. These equations are set on a 1D graph and were obtained by letting the diameters of the tubes tend to zero in some asymptotic process. They are characterized by a convolution in time in the diffusion operator, with a weakly singular kernel in time that are computed from the solution of local heat equations (with Dirichlet Conditions) in 2D domains that represent the cross sections of the tubes of the initial network. This talk is more about these kernels: theoretical results and numerical computations of the kernels. We obtain in particular asymptotic expansions for small times in different ways: for smooth cross section inspired by techniques developped by Gie, Hamouda, Jung and Temam (Singular Perturbations and Boundary Layers, Springer), or for specific cross sections (rectangles, disks, equilateral triangles) with specific techniques.