WEIRAN SUN, Simon Fraser University

Radiative Transfer Equation with the Henyey-Greenstein Kernel

Radiative transfer equations with the Henyey-Greenstein kernel are often used to model light scattering in media such as animal tissues. In such models the forward-peakness of the scattering kernel is measured by an anisotropic factor g. It is known in the physics literature that asymptotic behaviour when $g \to 1$ is not the classical Fokker-Planck operator. Indeed in this talk we show that the limit should be a fractional Laplace operator on the sphere. Based on this analytical result, we design numerical schemes for approximating the scattering operator with the Henyey-Greenstein kernel. Unlike previous results when the mesh size depends on g and have to be refined as g approaches 1, our method is uniform in g. This reduces the computational cost when g is close to 1 and can provide an efficient scheme for solving RTE over the region where g varies in different parts.