Numerical Simulation of Particle Size Distribution by Using the Quadrature Method of Moments (QMOM)

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The behavior of aerosol flow can effect various system modifications and particle size strongly influences the dynamical behavior of aerosol. In this study we simulate the evolution of particle size distribution in time and space. The general dynamic equation (GDE) describes the aerosol dynamics in terms of a particle size distribution function. To solve the general dynamic equation by computational fluid dynamics (CFD) code, the quadrature method of moments is used. GDE is transformed the moments equation, which is similar in many respects to governing equations CFD code solves. QMOM uses Gaussian quadrature to evaluate integrals appearing in the moment equations and therefore does not require any assumptions on the form of the size distribution function and coagulation. GDE accounts for the changes of the size distribution moment due to the external processes of convective transport, transport by diffusion as well as the internal processes of coagulation, condensation and evaporation, homogeneous nucleation.