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**Continuous Stochastic Equations for Diatomic Rarefied Gas Flows** HOSSEIN GORJI, PATRICK JENNY, Institute of Fluid Dynamics, ETH Zurich — In this talk, we postulate a non-linear Fokker-Planck model for simulations of the rarefied gas flows whereas the gas molecules would possess the internal degrees of freedom (DoF). The main motivation of the proposed model is the computational efficiency which is obtained due to the fact that in this solution algorithm no collisions between notional particles have to be calculated. The model equation is based on the Fokker-Planck approximation of the Boltzmann equation which has already been used for the motion of monatomic gas molecules by authors. However, a new set of stochastic differential equations (SDEs) is proposed for internal modes of the diatomic molecules. Based on the proposed model the heat conductivity of nitrogen is calculated for the range of temperatures from 200 to 800 K and it is shown that excellent agreement with regard to experimental results is gained.

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