Abstract :
In this talk we will present a derivation principle of BGK models using the resolution of an entropy minimization problem.
The construction is based on the introduction of relaxation coefficients and a principle of entropy minimization under constraints for moments. These free parameters are next adjusted to transport coefficients when performing a Chapman-Enskog expansion up to Navier-Stokes. Firstly, the methodology will be explained and illustrated for monatomic and polyatomic single gases.
Next the case of gas mixtures is considered. In this part, after clarifying the Chapman-Enskog, a BGK model is derived. This BGK model is proved to satisfy Fick's and Newton's laws. In a last part, we will explain how to extend our model to reacting gas mixtures.