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65211. *Stable and unstable galaxy models.*

A widely used model for galaxy dynamics is the Vlasov-Poisson system or so called collisionless Boltzmann equation. In this model, the collision is ignored because of the very long relaxation time. There exists infinitely steady states of this model, which can be used to match the observed galaxy and understand their evolution. We consider the simplest type of steady models, the radially symmetric galaxy. We prove nonlinear stability under radial perturbations of King's model, which is considered to be the most important spherical galaxy model. We also find a new linear instability criterion and show how to pass from linear to nonlinear instability. This is joint work with Yan Guo. There are some similarities between 3d Vlasov-Poisson and 2D Euler equation for ideal fluids. Some techniques used in this study had been also useful in the fluid stability problems. I will describe these similarities and also the differences. (Received September 11, 2006)