Comparative study between N-body and Fokker-Planck simulation : Rotating star clusters

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We have carried out realistic N-body simulations using most up-to-date NBODY6 code for rotating star clusters with single and multi-mass components. We have employed rotating King models as initial models and imposed tidal boundary such that the stars with energy greater than the potential energy at the tidal radius are removed from the cluster. The results are compared with those of Fokker-Planck (FOPAX) models with same tidal conditions. In general, these two different approaches are found to produce fairly similar results, although there are some different behaviors in the detailed aspects. For equal-mass, models we confirmed the acceleration of core collapse. The evolution trends of central density and central velocity dispersion are found to be similar in both simulations. However, there exists some differences in core-collapse and evaporation time scales. The differences in those time scales are found to be less than 15%. The FOPAX models have shorter evaporation time than N-body when the time scale is measured in units of half-mass relaxation time. After the core-collapse, the inner parts of the cluster expands more rapidly in FOPAX than in that of N-body.

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