Dynamical Evolution of Rotating Stellar Systems with Mass Spectrum*

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We have studied the dynamical evolution of rotating star clusters with mass spectrum using a Fokker-Planck code. As a simplest multi-mass model, we first investigated the two-component clusters. Rotation is found to accelerate the dynamical evolution through the transfer of angular momentum outward. However, the degree of acceleration depends sensitively to the assumed initial mass function since the dynamical friction which also tends to accelerate the evolution compete with the effect of rotation. As long as dynamical friction dominates in the competition with angular momentum exchange the heavy masses lose random energy and angular momentum, sink towards the centre, but their remaining angular momentum is sufficient to speed them up rotationally. This is gravo-gyro instability. As a consequence, we find that the high mass stars in the central parts rotate faster than low mass stars. This leads to the suppression of mass segregation compared to the non-rotating clusters. From the study of multi-component models, we observed similar trends to the two-component models in almost all aspects. The mass function changes less drastically for clusters with rotation. Unlike non-rotating clusters, the mass function depends on R and z. Our models are the only ones that can predict mass function and other quantities to be compared with new observations.

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