

Evolution of star clusters in arbitrary tidal fields

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We present a novel and flexible tensor approach to computing the effect of a time-dependent tidal field acting on a stellar system. The tidal forces are recovered from the tensor by polynomial interpolation in time. The method has been implemented in a direct-summation stellar dynamics integrator (NBODY6) and test-proved through a set of reference calculations: heating, dissolution time and structural evolution of model star clusters are all recovered accurately. The tensor method is applicable to arbitrary configurations, including the important situation where the background potential is a strong function of time. This opens up new perspectives in stellar population studies reaching to the formation epoch of the host galaxy or galaxy cluster, as well as for star-burst events taking place during the merger of large galaxies. A pilot application to a star cluster in the merging galaxies NGC 4038/39 (the Antennae) is presented.

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