
Calculating the centrifugal deformation of stellar or planetary models with RUBIS

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Abstract

RUBIS (Rotation code Using Barotropy conservation over Isopotential Surfaces) is a python-based code that calculates the centrifugal deformation of a star or planet for a given cylindrical rotation profile, starting from a spherically symmetric non-rotating model. It does so by preserving the relation between pressure and density, and can handle models with a discontinuity, for example a gaseous giant planet with a solid core. In this talk, I will outline how the RUBIS code functions both in the continuous and discontinuous cases, and describe a convergence acceleration scheme which enables convergence, even at 99.99 % of the critical rotation rate. This will then be followed by comparisons, in terms of structure, gravitational moments, and pulsation frequencies, with rotating polytropic and realistic models coming from independant codes such as ESTER (Evolution STEllaire en Rotation).

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