

Mass transfer and stability of close binary systems

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Abstract

The dynamics of close binary systems in case of mass exchange between binary components is studied. Lagrangian of the dynamical system is derived, where non interacting and interacting terms are identified. Two approximations to the mass exchange model are analyzed. In the first model mass accretion rate depends on the distance between the stars. In this case the radius of the Roche lobe should be explicitly used and other properties of accretion should be used from phenomenological models. In the second approximation mass accretion rate is function of time and the system can be described by nonlinear wave equation. Wave equation is solved in the linear approximation and necessary condition for the system stability are shown.