The stability criteria for three-body system

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The three-body problem arises in many connections in stellar dynamics: three-body scattering drives the evolution of star clusters, and bound triple systems form long-lasting intermediate structures in them. Here we address the question of stability of triple stars. For a given system the stability is easy to determine by numerical orbit calculation. However, we often have only statistical knowledge of some of the parameters of the system. Then one needs a more general analytical formula. Here we use Mathematica to tune coefficients for a theoretical stability limit formula in pericenter distance of the outer orbit for different mass combinations, outer orbit eccentricities and inclinations using results of numerical orbit calculations.