

The researchers provides theoretical unification of several effects that have previously been studied. And link theoretical modeling with observational analysis by using real data. The derivation based on orbital angular momentum, the rate of change of orbital separation, and the Eggleton Roche-lobe formulation appears mathematically consistent in structure.

The researchers adopt the additive definition:

$$\zeta^\uparrow = \sum_i \zeta_i$$

which requires a precise clarification to ensure that no double counting occurs between magnetic braking and tidal torque contributions.

The derived equation:

$$\dot{M}_1 = \frac{R_{1,nuc}/R_1 + R_{L,AML}/R_L}{\zeta^\uparrow/R_L - \zeta_{ad}/R_1}$$

provides an appropriate framework to describe the evolution of the system at the onset of Roche-lobe overflow .

The use of Chaturvedi et al. (2018) data is an important step toward connecting the model with observational reality. But the sample is small (only four systems), and the mass-ratio range is limited.

The proposed method is to adjust stellar structure models to match the observed stellar radius, and after that extracting:

$$\zeta_{ad} = \frac{d \ln R}{d \ln M}$$

However, the paper does not present: the derived values of  $\zeta_{ad}$ , the associated uncertainties, or a sensitivity analysis of internal model parameters.

The model depends strongly on parameters such as:

$$K_{MB}, \alpha_{AM}, \tau_{sync}$$

which are poorly constrained, making the predicted critical mass ratio  $q_{crit}$  highly sensitive to assumptions.

Decision: minor Revision

- The idea is original and important and the theoretical derivation is strong.