A SIMPLIFIED MODEL FOR A NONLINEAR TIDAL EFFECT ON ACCRETION DISKS IN CVS

ZHONG-YONG ZHANG and JIAN-SHENG CHEN
Beijing Astronomical Observatory, Chinese Academy of Sciences, Beijing 100080, People's Republic of China

Abstract

This paper investigates the tidal effect on accretion disk in CVs and sets up a simplified model in which the secondary's gravitation is substituted by a mean tidal torque. We find that a linear tidal torque will not be able to maintain an equilibrium disk. By using the result of the radius of the equilibrium disk approximately equals to the tidal radius, which was obtained by using the two dimensional numerical simulation invoking nonlinear tidal effect, we give the modified tidal dissipation function for our simplified model which could be used to interpret the outburst of the dwarf nova with tidal effect. The paper also shows that the radius of an equilibrium disk with a torus is slightly small than the Lubow-Shu radius, and the tidal effect may also cause the cycle of quiescence-superoutburst in addition to the cycle of quiescence-outbursts-superoutburst.

Key words: CVs – Accretion disk – Tidal effect

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