

Period and Light Variations for the W Ursae Majoris type binary BX Pegasi

Jae Woo Lee^{1,2}, Chun-Hwey Kim¹, Wonyong Han²

¹Department of Astronomy and Space Science, Chungbuk National University, Cheongju 361-763, Korea

²Korea Astronomy Observatory, Taejeon 305-348, Korea

New CCD photometric observations of the W UMa type binary BX Peg were performed for 4 nights from October 1999 to September 2000. Seven new times of minimum light were determined. The orbital period of the system has varied recently in a sinusoidal way, superimposed on a downward parabolic variation. The long-term period decrease rate is deduced as $dP/dt = 1.73 \sim 1.78 \times 10^{-7} \text{ day/yr}$, which can be interpreted by either mass transfer from the more (secondary) to less massive component or the combination of mass transfer and angular momentum loss due to a magnetic stellar wind. The sinusoidal variation, with a period of 16.7 years and an amplitude of $0^d.0045$, can be explained by the light-time effect via the presence of a third body or the magnetic activity of the massive component. The light curves of BX Peg are asymmetric and show seasonal light variability. The spot models were applied to fit the asymmetrical light curves. After adopting the light curves of 1999 as reference ones, we modelled those of 2000 by adjusting only the spot and luminosity parameters. The cool spot model on the secondary fits the observed light curves of both 1999 and 2000 quite well. We believe, therefore, that we have achieved a creditable representation of the BX Peg system in both the photospheric and spot descriptions.