A study of evolutionary self-gravitating polytropic $\beta$-viscous accretion disks with troidal magnetic field

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Abstract
In this paper, the effect of troidal magnetic field is studied in standard self-gravitating thin disks with $\beta$ prescription. By applying the magnetic field, we expect to see different behaviors compared to a non-magnetic field case. The study reveals self-similar solutions for radial infall velocity, rotation velocity, surface density and mass accretion rate. Our results also show that by increasing the magnetic field, the radial velocity and mass accretion rate, at least in the inner regions of the disk, become slow and low, respectively. By contrast, in the outer regions, the azimuthal velocity and surface density become fast and high, respectively.

Keywords: accretion, accretion disk, MHD

For full article, refer to the Persian section.