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Viscoelastic Taylor-Couette instability as an anolog of Magnetorotational instability[1] INNOCENT MUTABAZI, YANG BAI, OLIVIER CRUMEYROLLE, LOMC, UMR 6294, CNRS-University of Le Havre — Our investigation of the viscoelastic instability (VEI) in the corotating Couette-Taylor system is motivated by the prediction of Ogilvie et. al that such an instability is analogous to the MRI (magneto-rotational instability) which is believed to play a key role in the angular momentum transport in accretion disks. This analogy is supported by stretched spring argument developed by Balbus and Hawley which is similar to that of the polymer stretching model in viscoelastic solutions. To our best knowledge, only one experiment by Boldyrev et al. has been reported for the search of the analogy VEI-MRI. We present both theoretical and experimental results obtained in the viscoelastic Couette-Taylor system when both the cylinders are constrained to rotate along the Keplerian and anti-Keplerian lines. The polymer solutions have a constant solution with respect to shear rate and can be described by the Odlroyd-B model. The control parameters are the aspect ratio Γ, the radius ratio η, the Reynolds number Re, the elastic number $E = Wi/Re$ and the viscosity ratio $S = \mu_p/\mu$. After linear stability analysis, critical modes are oscillatory and non-axisymmetric. The observed modes are either stationary or oscillatory modes. A state diagram allows for a comparison to MRI

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