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Near wall effects on flexible splitter plate behind a cylinder VENKAT NARAYANAN K, DR VENGADESAN S, DR MURALI K, Indian Inst of Tech-Madras — Vortex induced vibrations(VIV) of a rigid circular cylinder with a flexible plate attached to its rear end, close to the plane wall is numerically studied for Re = 200. Amplitude modulations were observed in the response of the flexible plate at the ground distance of $\frac{G}{D}$=0.5. Numerical simulations were conducted for a range of reduced velocities Ur(3,4,5 and 6), which appropriately captures the synchronization range of VIV of the structure. At U_r=3 there is no significant amplitude modulation. As Ur is increased further, the modulation appears. The modulation appears symmetric about the peak amplitude for successive cycles at U_r=4. The phase plots of lift coefficient C_L and plate tip displacement revealed the change in sign of energy transfer between the plate and the wake. Amplitude modulation is reflected in the interaction of shed vortices and the plane wall. Shed vortices are convected parallel to the wall when the amplitude of the plate rises to its local maximum during modulation. During the growth and damping phase of the amplitudes in each modulation cycle, the vortex shedding is observed to be oblique towards the wall.

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