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**Vortex-induced vibrations of a cylinder in planar shear flow** SIMON GSELL, IMFT / M2P2, REMI BOURGUET, MARIANNA BRAZA, IMFT — Vortex-induced vibrations (VIV) of bluff bodies are common in nature and in engineering applications where flexible or flexibly mounted structures are exposed to wind and ocean currents. VIV have been thoroughly studied through the canonical problem of an elastically mounted, rigid cylinder immersed in uniform flow. However, in the real physical systems where VIV develop, the oncoming flows are usually non-uniform. The present work investigates the impact of a shear of the oncoming current in the cross-flow direction. As a first preliminary step, focus is placed on the fixed cylinder case; the analysis is based on a series of numerical simulations over a wide range of shear rates, at Reynolds number 100. It is found that the shear leads to the cancellation of wake unsteadiness beyond a critical value of the shear rate. Once the rigid cylinder is elastically mounted, free vibrations arise over the entire range of shear rates under study, including beyond the above mentioned critical value. Different flow-structure interaction regimes are uncovered. Some of them exhibit a major deviation from the uniform-flow case, with a profound reconfiguration of the wake patterns and a dramatic amplification of the structural response amplitudes.

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