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Wake Structure of Oscillating Cylinders MICHAEL COHRS, WAYNE ERNST, ASHWIN VAIDYA, Montclair State University — We studied the vortex-induced oscillations of a tethered cylinder in a flow tank. The cylinder shows various changes (steady, periodic, autorotation) in its orientation as a function of Reynolds number and particle aspect ratio. In particular, we examine a new metric- namely, the distance from the cylinder to the vortex as a function of the Reynolds number. This simple metric proves to be very helpful in characterizing the changes in vortex structure and serves as a useful marker for the various bifurcations in the flow. It is implied through data visualization that this critical point (which indicates a change in wake structure) is present regardless of the lengths of the cylinders. We examined Reynolds numbers in the range of about Re = 550 to Re = 4800, based on the cylinder's length. We also examined relationships between Strouhal number for the particle and associated vortex as a function of Reynolds number and particle aspect ratio.

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