

Abstract Submitted
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Motion Response of 2 DOF Circular Cylinder in Bundle Arrangement HENDIK HANS, VINH TAN NGUYEN, Institute of High Performance Computing, A*STAR — This study focuses on the motion response of a freely vibrating in streamwise and crossflow circular cylinder in the wake of two leading stationary circular cylinders. Studies on the effects of spatial positioning of the trailing circular cylinder to its amplitude and frequency response are conducted. In order to explain the effects of mass ratio and phase angle on the motion response of the structure, analytical model based on tandem cylinder arrangement are presented. For almost all reduced velocities, the results indicated larger crossflow amplitude of oscillation as the trailing cylinder is aligned to the centerline of one of the leading circular cylinder. Two dominant response frequencies are found on the trailing circular cylinder. Switching between the two response frequencies as the dominant response frequency is found to be strongly related to the natural frequency of the system. Additionally, the mass ratio played a significant role in determining the intermittent domination of the Vortex-Induced Vibrating (VIV) frequency of the structure. For low mass ratio, larger mass ratio is found to increase its amplitude of oscillation.

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