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Noise Characterization of a Two Circular Cylinder Flow Induced Vibration Energy Harvester System APRIL JANG, CHRISTOPHER O'NEILL, BRANDON MCNEELY, ROBERT MARTINUZZI, CHRIS MORTON, University of Calgary — The development of flow induced vibration (FIV) energy harvesters is an active area of interest as an alternative to traditional hydropower systems. We have developed a mechatronic system to investigate FIV of two circular cylinders (of diameter D and D/8) in proximity. The smaller diameter cylinder (referred to as the 'control' cylinder) is controlled via a two degree of freedom (x,y) traverse system. The system uses a genetic algorithm to find the optimal parameters describing a sinusoidal motion of the control cylinder, in order to maximize the amplitude response of the FIV of the larger diameter cylinder. In testing this system, various sources of noise have been identified that disrupt the genetic algorithm's ability to find the optimal control cylinder parameters. To minimize the impact of noise on the system, a secondary genetic algorithm will be used to characterize the noise properties of the system as a function of the control cylinder parameters. Insights from this analysis will allow for modifications to both the mechanical system and the software to improve the overall performance of the system.

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