Abstract Submitted
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Effects of the geometry of the exit of a tube in an oscillating flow[1] ELIA ECHEVERRÍA, College of Science and Technology, UACM, CARLOS MÁLAGA, Phisics Department, School of Science, UNAM, STEVEN CZITROM, ICMyL-UNAM, ARTURO OLVERA, IIMAS-UNAM, CATALINA STERN, Phisics Department, School of Science, UNAM — The problem of optimizing the performance of a wave-driven seawater pump –comprising a resonant duct and an exhaust duct joined by a variable volume air-compression chamber– it is explored by studying oscillating flows at the exit of a tube. It is known that the performance of this pump depends on the geometry of the mouth of its intake tube. An inspection of the integral expression of the Navier-Stokes equation along a central streamline of this flow shows that changing the shape of the tube's mouth modifies only the inertia and energy losses terms because both depend on the flow field at the chosen streamline. These changes must be such that the integral relation is preserved. Therefore, by measuring the inertial term (known as added mass), the term for losses can be measured indirectly. We developed a method to measure the added mass for oscillating flows in tubes with different mouth shapes and compared these measurements with those obtained for a model of the flow through the pump. Our results suggest a way to find a criterion for choosing the geometry of the mouth of the tubes in order to minimize dissipation and improve efficiency of the pump.

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