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ELECTROMAGNETIC FLUID-STRUCTURAL ENERGY HARVESTING: ENERGY BALANCE AND COUPLING MECHANISMS

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Abstract. Energy harvesters are promising candidates for achieving the self-powering of flow sensing systems. We present an analysis of the energy transfer mechanisms occurring in internal flow electromagnetic energy harvesters. The focus is on derivating the expressions that describe the coupling between the electromagnetic, flow and structural systems. We analyze the physics of the mechanisms that dominate the conversion of flow kinetic energy into electricity and propose a metric for the harvester's efficiency.