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Optimal energy harvesting from long cables in VIV CLEMENT GROUTHIER, SEBASTIEN MICHELIN, EMMANUEL DE LANGRE, Ecole Polytechnique - LadHyX — Vortex-induced vibrations (VIV) of flexible structures in steady flows may result in large amplitude self-sustained oscillations of the solid, making it an attractive mechanism for energy harvesting. Here, we investigate the possibility of harvesting energy using long tensioned cables in VIV with localized energy extraction. The non-linear fluid-solid dynamics is described using a classical Van der Pol wake oscillator and the energy harvesting device is represented by a discrete damping distribution (dashpots). The cable extracts energy from the flow along its entire length, but it is also responsible for the transport of the harvested energy toward the dashpots. Focusing on the permanent saturated regime, we study this energy transfer along the cable, and determine the optimal damping distribution that maximizes the harvested energy.

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