Robot for Power Line Vibration Control

VTIP 20-084: “Self Powered Autonomous Robot for Power Line Vibration Control and Inspection”

THE CHALLENGE

Wind induced vibrations are a major concern in engineering structures like power lines and suspended cables. Often caused due to inclement weather, these vibrations result in annual outage costs of between $18-$33 billion, according to the Department of Energy. While conventional methods include fixed passive vibration absorbers, they are not able to adapt to changing wind characteristics and thus don’t work optimally.

OUR SOLUTION

Oumar Barry and team have developed a self powered robot capable of damping these vibrations and also conducting overhead line inspection. Given the light weight, compact, and self-powered design, the robot can be permanently mounted on the power lines. By sensing the wind characteristics, it is able to slide along the cable to the anti-node to successfully and optimally damp the vibrations.

The design can also be modified for similar applications in suspension bridges, gas pipes, and other difficult-to-access environments.

(a) Output power of adaptable vs non-adaptable energy harvester, (b) position of the sliding mass with respect to beam length.

Performance comparison between fixed and moving vibration damper.

The self-powered autonomous robot.

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