# Article information:

A consistent geometrically nonlinear model of cantilevered piezoelectric vibration energy harvesters - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S0022460X20304454>

# Article summary:

1. A novel geometrical nonlinear model for piezoelectric energy harvesters is proposed, which considers the effects of geometrical nonlinearity on the boundary conditions.

2. The proposed model shows better agreement with experiments on the output voltage in comparison with the common geometrical nonlinear model.

3. Numerical simulations show that the optimum load resistance increases and the resonant frequency decreases when the excitation level increases due to the geometrical nonlinearity.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article “A consistent geometrically nonlinear model of cantilevered piezoelectric vibration energy harvesters” provides a detailed overview of a novel geometrical nonlinear model for piezoelectric energy harvesters, which considers the effects of geometrical nonlinearity on the boundary conditions and shows better agreement with experiments on the output voltage in comparison with the common geometrical nonlinear model. The article is well-written and provides a comprehensive overview of its topic, however there are some potential biases and missing points of consideration that should be noted.

Firstly, while it is mentioned that current theories inconsistently handle the geometrical nonlinearity of cantilevered PEHs, no further explanation or evidence is provided to support this claim. Additionally, while it is stated that numerical simulations show that certain parameters increase or decrease due to geometrical nonlinearity, no evidence or data is provided to back up this statement. Furthermore, while it is mentioned that high-level base excitations can lead to inaccurate estimations when using GLMs, no counterarguments are explored as to why this may not be true in certain cases or scenarios.

In addition, while it is mentioned that PEHs vibrate with large amplitudes when they are made of flexible materials and/or when excitation levels are relatively high, no mention is made as to what other factors may contribute to large amplitude vibrations such as material properties or environmental conditions. Lastly, while it is stated that vehicle suspension systems are application scenarios for vibration energy harvesting with high-level base excitations, no mention is made as to what other applications may benefit from this technology such as medical devices or consumer electronics products.

In conclusion, while this article provides an informative overview of its topic and presents its claims in a clear manner, there are some potential biases and missing points of consideration which should be noted before drawing any conclusions from its content.

# Topics for further research:

* Geometrical nonlinearity effects on boundary conditions
* Piezoelectric energy harvester applications
* High-level base excitation accuracy
* Material properties and vibration energy harvesting
* Vehicle suspension system vibration energy harvesting
* Medical device vibration energy harvesting

# Report location:

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