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Suspension bridge

Abstract

A bridge type known as a suspension bridge has its top suspended by vertical suspenders and suspension cables. Main suspension cables, primary towers, strengthening beams and struts, and the main structural elements of a suspension bridge system are cable anchorages at each end of the bridge. Vertical suspenders sustain the weight of the deck and the traffic load, while the main cables are stretched between towers and eventually connect to the anchorage or the bridge itself.

Introduction

Suspension bridges are structures that are used to cross rivers, valleys, and other obstacles. They are supported by cables and have a roadway or deck. Suspension bridges are known for their ability to span large distances. They are used in many different contexts. and in our research, we introduce many types of bridges: Simple suspension bridge and Simple suspension bridge.[1]

CONCLUSION

Suspension bridges are supported by cables anchored to towers and suspended above the roadway. Their motion can be modeled using a second-order differential equation, which can be used to simulate the bridge's response to various loads and identify potential design weaknesses. This information can help improve the safety and efficiency of suspension bridges, as demonstrated by the collapse of the Tacoma Narrows Bridge and the subsequent development of new design standards.

METHODOLOGY

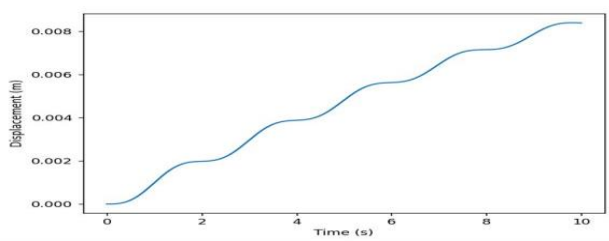
Construction of the suspension bridge is conducted in the following order:

1. The bridge deck is created last, followed by the main cables and towers.
2. The concrete tower base is built following the excavation.
3. The main cables are strung between the towers and secured at the ends once the anchorages are finished.
4. The construction of the deck begins when the suspenders are connected.

<u>The differential equation of a general suspension bridge</u>

$$mx``(t) + cx`(t) + kx(t) = F(t)$$ [2][3]

RESULTS



The output of this code is a plot of the displacement x(t) of the system as a function of time.

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References

[1] https://www.britannica.com/technology/suspension-bridge
[2] https://www.hindawi.com/journals/mpe/2010/805195/
[3] http://homepages.math.slu.cz/KarelHasik/Edwards_Penney%20-%20Elementary%20Differential%20Equations.pdf