Mathematics > Dynamical Systems

Periodically fighting shake, rattle and roll

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How easy is it to suppress shake, rattle and roll in a long bridge or a skyscraper? Most practical structures are designed so that long wave resonance vibrations can be avoided. However, there are recent examples, such as the Millennium Bridge in London or the Volga Bridge in Volgograd, which show that unexpected external forces may result in large scale unwanted shake and rattle. Full scale alteration of a bridge (or a skyscraper) would not be considered as an acceptable option, unless the structure has collapsed. Can we fix this by examining a representative part of the structure only and making small lightweight changes? We will do it here and illustrate an idea linking the engineering analysis to elastic waveguides.

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