Computer Simulation of Chladni's Figure and Research of Its Characteristics

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A chladni's figure is a symmetrical nodal line pattern formed by applying vibration to a uniform solid thin plate to form a two-dimensional standing wave by a specific frequency. It is widely used in acoustics, medicine, micromotor, and other fields. This project studied and explored the nature of chladni's figure. In terms of theory, we started to explore in-depth from the basic principles of mechanical waves, analyzed the possible patterns with the help of computer software Matlab, and verified the feasibility through experiments, and researched the application of music visualization. Through the combination of computer simulation and experiments, we found that only a uniform solid plate can form a chladni's figure at a specific frequency. And the higher the frequency applied, the more complicated the pattern formed. The position of the vibration source will also affect the symmetry of the figure. By applying the model, we can use it to make music visible, examine musical instruments and etc.

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