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The sound of chaos

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As a rule, the scientific papers describing phenomena occurring in the nonlinear systems are illustrated with lots of plots. If the system in question is oscillating, the papers contain figures presenting the shape of the oscillations indicating what happens to them, when motion of the system evolves from the regular to the chaotic one. Sometimes the papers present also Fourier spectra, in which the period doubling bifurcations are seen as the appearance of new, subharmonic peaks [1].

It is the aim of the author to indicate that when the oscillations are located within an appropriate frequency range (or if one shifts them to such a range) one is able to hear the transition from one to another mode of motion. For instance, the period doubling bifurcations are heard as clear, audible changes in the timbre of the sound. The period doubling bifurcations described in [2] were discovered in such a manner.

Many nonlinear system go through a number of various transitions arriving at the end to the point above which the motion becomes chaotic. Which is the sound of it? The author will answer the question.

References

- [1] A. Libchaber, C. Laroche et S. Fauve, Period doubling cascade in mercury, a quantitative measurement, *J. Physique Lett.* 43, 211 (1982).
- [2] 13. P. Pierański, Jumping particle model. Period doubling cascade in an experimental system, *J. Phys. (Paris)*, 44, 573 (1983).

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