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Numerical Study of Energy Conversion in the Taconis Oscillations by Tracing Fluid Particles SHIZUKO ADACHI, School of Business and Commerce, Tokyo International University, KATSUYA ISHII, Department of Information Science, Ochanomizu University — Temporal evolution of physical properties of spontaneous thermoacoustic oscillations of a helium gas in a closed cylindrical tube is obtained by solving the axisymmetric compressible Navier-Stokes equations. The ratio of the wall temperature of the hot part near both ends to that of the cold central part is 15. We trace fluid particles which start from various points in a closed tube for a fundamental mode oscillation of a standing wave and a second mode oscillation. Work done by the fluid particles is numerically estimated. Fluid particles drift in the closed tube while oscillating. Work done by fluid particles moving in a hot region during one cycle is negative in both excitation modes. Displacement of fluid particles moving in the finite temperature gradient region is large. They do not give a cyclic transformation in a pressure-volume diagram. Work done by fluid particles moving near the tube axis from the cold part to the hot part is positive. Work done by fluid particles moving in a cold region during one cycle is positive but the amount of the work is smaller than that in the hot region.

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