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Periodic oscillations of particles settling under gravity in a viscous fluid MARIA L. EKIEL-JEZEWSKA, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw — New periodic solutions of three spherical particles settling under gravity in a viscous fluid are found and their relation to chaotic dynamics of a cluster of three randomly distributed particles is shown. An analogue of this solution has not been detected in the point-particle approximation. However, the existence of such an unstable periodic orbit was previously suggested by Janosi et al., Phys.Rev. E,**56**, 2858 (1997) and was claimed to be responsible for the numerically observed chaotic scattering of three point-particles settling under gravity. The significance of periodic orbits for dynamics of sedimenting particles in other non-regular configurations is also illustrated by other examples.

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