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A numerical study of a freely-falling maple seed with autorotation[1] INJAE LEE, HAECHEON CHOI, Seoul National University — Many single winged seeds such as those of maples exploit autorotation to decrease the descending velocity and increase the dispersal distance for the conservation of species. In this study, a numerical simulation is conducted for flow around a freely-falling maple seed (*Acer palmatum*) at the Reynolds number of 1186 (based on the mean chord length and characteristic terminal velocity). We use an immersed boundary method in a non-inertial reference frame (Kim & Choi, JCP, 2006) for the simulation. After a transient period, the seed reaches the steady autorotation with a stable leading edge vortex attached on the surface of the wing at which the descending velocity significantly decreases. At steady autorotation, the descending velocity is proportional to the square root of disc loading. We also study the effect of the initial position of the seeds on the timing of autorotation, and show that the autorotation occurs earlier when the wing leading edge or nut is initially positioned upward.

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