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## A breakup of a droplet falling into a miscible solution

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When a droplet with a relatively high density falls into a miscible solution with a relatively low density, the droplet breaks up spontaneously. We investigated the number  $m$  of breakup in experiments with several density differences  $\Delta\rho$  between two solutions, viscosities  $\mu$ , and droplet radii  $r$ . The mode number  $m$  has a distribution even under the same experimental conditions. We propose a simple model of mode selection based on the linear Rayleigh-Taylor instability and the growing radius of a vortex ring deformed from the droplet. The model provides the probability distribution  $P(m)$  and a relationship between the nondimensional parameter  $G \propto \Delta\rho g r^3 / \mu^2$  and the average value of  $m$ , which are consistent with experimental results.