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Analogies between a drop impacting a solid surface, an oscillating sessile drop, and two coalescing drops SANTOSH APPATHURAI, MICHAEL HARRIS, OSMAN BASARAN, Purdue University — Numerous industrial processes involve the formation of drops which then collide with a solid substrate or another drop. When a drop impacts a solid surface without splashing, it may spread on the surface and then recoil, much like an oscillating sessile drop whose contact line is free to move. Were the impacting drop to make a fixed contact angle of 90 degrees with a substrate that exerts negligible viscous drag on the drop, the situation approximates well the aftermath of what happens once two drops have just started coalescing. Given the aforementioned analogies between these apparently quite distinct physical problems, the dynamics of each process is analyzed by solving numerically the 3D axisymmetric or 2D Navier-Stokes system using a well-benchmarked ALE algorithm based on the Galerkin/Finite Element Method (G/FEM) for spatial discretization and adaptive finite differences for time integration.

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