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A model for elastohydrodynamic collision of spheres in liquid JOHN WELLS, Ritsumeikan Univ., J.T. JENKINS, Cornell Univ. — We pursue a reduced-order model of normal "elastohydrodynamic" collision between two spheres in incompressible liquid (Wells 1993; *Proc. Powders & Grains '93*, "W93"). W93 *assumed* a "quasi-Hertzian" surface depression profile, yielding the first reduced-order model ODEs for this problem. Trajectories and coefficients of restitution agreed well with simulations (Davis, Serayssol, & Hinch , 1986; *J. Fluid Mech* 201; "DSH86"). To avoid numerical integrations such as those in W93, Lian *et al.* (1996, *J. Fluid Mech* 311) assumed additionally that the gap inboard of a certain radius was constant, leaving only the centerline gap as an unknown. Then introducing an adjustable constant, they recovered coefficients of restitution close to DSH86. The present work extends W93 and Lian *et al.* to achieve, without adjustable constants, the analytical character that until now was only afforded by perturbation approaches (DSH86) wherein centerline deformation is assumed to be much smaller than the gap.

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