Contact lens and tear film dynamics during blinking[1] TIMOTHY REID, DANIEL ANDERSON, George Mason University — We develop a mathematical model that couples the dynamics of the tear film and contact lens during blinking. We derive an ordinary differential equation for the motion of the contact lens (parallel to the cornea) driven and retarded by viscous forces in the thin fluid films separating the contact lens from the eyelids and the corneal surface. Using the contact lens motion and tear film dynamics models we calculate a numerical solution of tear film thickness, showing that the lens and lid motion influence the tear film dynamics. The numerical solution uses a mapped Chebyshev spectral method for the spatial derivatives to reduce the model to a system of differential algebraic equations.

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