Texas Tech University. Applied Mathematics Seminar.

# On the existence of solutions to a two-point boundary value problem involving capillary effect in fluid mechanics

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**ABSTRACT.** We consider a problem where a liquid and a gas are bounded between two parallel plane surfaces with a capillary surface between the liquid-gas interface. The liquid-plane interface is considered to be non-ideal, which implies that the contact angle of the capillary surface at the interface is set-valued, and change in the contact angle exhibits hysteresis. We analyze a two-point boundary value problem for the fluid flow described by the Navier-Stokes and continuity equations, wherein a capillary surface with one contact angle is deformed to another with a different contact angle. We show the existence of non-unique classical solutions to this problem, and numerically compute the dissipation.