Weak Solutions to Lubrication Systems Describing the Evolution of Bilayer Thin Films

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We prove existence of global non-negative weak solutions for coupled one-dimensional lubrication systems that describe the evolution of nanoscopic bilayer thin polymer films. We consider Navier-slip and no-slip conditions at both liquid-liquid and liquid-solid interfaces. Additionally, we show existence of positive smooth solutions when attractive van der Waals and repulsive Born intermolecular interactions are taken into account. This is a joint work with Georgy Kitavtsev and Roman Taranets.