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A fluid-dynamical model for the "anti-surfactant" behaviour of salt solutions STEPHEN WILSON[1], JUSTIN CONN, DAVID PRITCHARD, BRIAN DUFFY, Department of Mathematics and Statistics, University of Strathclyde, PETER HALLING, Department of Pure and Applied Chemistry, University of Strathclyde, KHELLIL SEFIANE, School of Engineering, University of Edinburgh — We formulate and analyse a novel fluid-dynamical model for the flow of a solution with a free surface on which surface tension acts. This model, which uses the concept of surface excess, can describe both classical surfactants and aqueous salt solutions. These latter solutions have the anomalous property that in thermodynamic equilibrium the surface tension increases with increasing salt concentration, i.e., so-called "anti-surfactant" behaviour. We demonstrate the utility of the model by considering the stability of a deep layer of initially quiescent fluid, and identify the possibility of an anti-surfactant instability driven by Marangoni effects.

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Stephen Wilson
Department of Mathematics and Statistics, University of Strathclyde

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