ON A POISSON-MAXWELL-STEFAN MODEL FOR ISOBARIC ISOTHERMAL ELECTRICALLY CHARGED MIXTURES

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ABSTRACT

In this talk I will give a short introduction to a Poisson-Maxwell-Stefan model and present a new result addressing the global-in-time existence of weak solutions. The model describes the dynamics of a charged multi-component mixture with N species in a bounded domain. The equations consist of a cross-diffusion system for the molar fractions, whereby the flux is only implicitly known through the Maxwell-Stefan equations, and a Poisson equation for the electric potential. After establishing the model, I will present the key ideas of the existence proof and propose a new finite-element scheme, taking advantage of the entropy structure of this model. The main mathematical difficulties evolve from the lack of a maximum principle for this system, the treatment of different molar masses and the drift term involving the electrical potential.

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