

On a 3D phase-field model with convection under a magnetic field effect

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Abstract. In this talk we discuss a three-dimensional isothermal model of solidification for a binary alloy with melt convection and under a magnetic field effect. The model consists of a highly non-linear system of partial differential equations for the state variables: the velocity field, the pressure, the potential function of the electrical field, the phase-field which represents the solid/liquid phase of the alloy, and the concentration. The well-posedness of the model is presented. Moreover, the existence of solutions when the diffusion coefficient of the concentration equation vanishes for some values of the phase-field is investigated.