LOCAL EXACT CONTROLLABILITY OF A SOLIDIFICATION MODEL WITH FEW CONTROLS

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In this work it is analyzed a control problem with a reduced number of controls for a phase field system modeling a solidification process of materials that allow two different types of crystallization and the flow of material in the nonsolid regions. In this system we have three Allen-Cahn equations describing the phase field functions coupled to modified Navier-Stokes system and a heat equation for the temperature. It is proved that this system is locally exactly controllable to suitable homogeneous trajectories with controls acting only on the velocity field and heat equations. One of the difficulties of this work is that the three phase field equations are controlled by the velocity and temperature functions, but the coupling is multiplicative in the mentioned equations.

Joint work with Fágner D. Araruna and Enrique Fernández Cara.

References

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