The Cahn–Hilliard–Oono system with control in the mass term

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The problem of optimal control for the Cahn–Hilliard–Oono system is addressed, where the control u is located in the mass term. First, well-posedness of the problem and the dependence of the phase variable on the control u are considered, all this by admitting general potentials that include both the case of regular potentials and the case of some singular potential. Next, the so-called separation property is discussed: it holds for everywhere defined regular potentials in 2D and 3D and for the logarithmic potential in 2D. Finally, in this framework, for the control problem it is shown that an optimal control exists; the control-to-state map is Frechet differentiable; a proper variational inequality involving the solution of an adjoint system is a necessary condition for optimality. The results reported in this talk have been obtained in a collaboration with G. Gilardi, E. Rocca and J. Sprekels.