



Norwegian University of Science and
Technology
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Sciences

TMA4310 Optimal
control of PDEs
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Exercise set 11

We continue with extending the results for linear-quadratic control of elliptic PDEs to semi-linear elliptic case.

Reading:

Section 4.5–4.7 in [Tr].

Recommended exercises:

1. Exercises 4.7, 4.8 in [Tr].
2. Provide some details (for example at the level of Section 4.5.1 in [Tr]) for the continuity and differentiability of the control-to-state operator of the boundary control problem, see Section 4.5.2.
3. Utilize the formal Lagrange method on the control problem (4.57)–(4.59) in [Tr] using two separate Lagrange multipliers p_1 and p_2 for the PDE and the boundary conditions. Conclude that the resulting derivations (adjoint problem, optimality conditions) are equivalent to (4.61)–(4.62), that is, p_1 and p_2 are related at the boundary.