

ON THE OPTIMAL CONTROL PROBLEM IN A PARABOLIC  
SYSTEM

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**Abstract**

Optimal control problems in the parabolic problems for different types of cost functionals have been examined by several authors [1, 2, 3, 4]. In this study, we study the optimal control problem governed by on linear parabolic differential equation with Dirichlet boundary conditions. The control function is at the right hand side of the equation. The cost functional consist of deviation in the  $L_2$ -norm of the solution of the system at the final time from a given target, plus  $L_2$ -norm of the control. It is proved that the Frechet derivation of the cost functional can be found via the solution of the adjoint parabolic problem. The results are illustrated by an numerical example.

**Keywords:** second-order parabolic equations, weak soluations, optimal control

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