

Finite Element and Split Bregman Methods for Solving a Family of Optimal Control Problem with Partial Differential Equation Constraint

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Abstract : In this article, we will discuss the solution of elliptic optimal control problem. First, by using the finite element method, we obtain the discrete form of the problem. The obtained discrete problem is actually a large scale constrained optimization problem. Solving this optimization problem with traditional methods is difficult and requires a lot of CPU time and memory. But split Bregman method converts the constrained problem to an unconstrained, and hence it saves time and memory requirement. Then we use the split Bregman method for solving this problem, and examples show the speed and accuracy of split Bregman methods for solving these types of problems. We also use the SQP method for solving the examples and compare with the split Bregman method.

Keywords : Split Bregman Method, optimal control with elliptic partial differential equation constraint, finite element method

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