

Irrigation problem with cost L^1 and cost L^2

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Water scarcity is a reality in several countries, with serious implications for agriculture. The authors have developed irrigation models with the aim of saving water and ensuring healthy crops. These models are formulated as optimal control problems with state constraints, one with a cost function L^1 and the other with a cost function L^2 .

Since it is not possible to get the analytical solutions, the problems are solved numerically and then partially validated using the Maximum Principle. The numerical solutions and the challenges of applying the Maximum Principle to the models with cost functions L^1 and L^2 are presented here.

It's common that the models depend on parameters that are hard to estimate. Sensitivity analysis helps understand how optimal solutions are affected by uncertainties in the parameters. In these models, the parameter of interest is the percentage of water loss due to runoff and deep infiltration in the field. Based on this analysis, we apply sensitivity results to the L^1 and L^2 problems.

References

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