Second order analysis for the optimization of time delays

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For a nonlinear ordinary differential equation with time delay, the differentiation of the solution with respect to the delay is investigated. Special emphasis is laid on the second-order derivative. The results are applied to an associated optimization problem for the time delay. A first- and second-order sensitivity analysis is performed including an adjoint calculus that avoids the second derivative of the state with respect to the delay.

References:

[1] K. Kunisch and F. Tröltzsch, Second order analysis for the optimal selection of time delays, Accepted 2024 by Mathematical Control and Related Fields

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