# Generalized Cross Validation for Tikhonov regularization of large-scale problems

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Generalized Cross Validation (GCV) is a popular approach to determining the regularization parameter in Tikhonov regularization. The regularization parameter is chosen by minimizing an expression, which is easy to evaluate for small-scale problems, but prohibitively expensive to compute for large-scale ones. We describe a novel method, based on Gauss-type quadrature, for determining upper and lower bounds for the desired expression. These bounds are used to determine the regularization parameter for large-scale problems. This talk presents joint work with Caterina Fenu and Giuseppe Rodriguez.