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A Note on Hard Cases For Conjugate Gradient Method[1]

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ABSTRACT

The Conjugate Gradient (CG) method is often used to solve a positive definite linear system $Ax = b$. This paper analyzes two hard cases for CG or any Krylov subspace type methods by either analytically finding the residual formulas or tightly bound the residuals from above and below, in contrast to existing results which only bound residuals from above. The analysis is based on a general framework to estimate CG and MINRES residuals for certain linear systems, and the framework may potentially be useful elsewhere.

[1]This report is available on the web at `http://www.ms.uky.edu/~math/MAreport/`.

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