ERRATUM: PHASE RETRIEVAL BY LINEAR ALGEBRA

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Abstract. The purpose of this erratum is to correct a mistake in naming the matrix norm defined in eq. (10) of [SIAM J. Matrix Anal. & Appl., 38 (2017), pp. 854-868] and subsequent interpretation of the numerical results.

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The definition given in eq. (10) of [1], which is reproduced below,

\[ \|x_0 x_0^* - x_{\text{null}} x_{\text{null}}^*\| = \sqrt{2(||x_0\||^4 - |x_0^* x_{\text{null}}|^2)} \]

is the Frobenius norm of \(x_0 x_0^* - x_{\text{null}} x_{\text{null}}^*\), instead of the spectral norm, as originally stated in [1], provided that \(||x_0\|| = ||x_{\text{null}}||\).

Likewise, the relative error (RE) defined in eq. (60) of [1] is in terms of the Frobenius norm, not the spectral norm. The interpretation of RE in Figures 1, 2 and 3 of [1] should change accordingly.

To see the right hand side of eq. (10) of [1] yield the Frobenius norm, note that the Frobenius norm of any matrix \(H\) equals \(\sqrt{\text{Tr}(H^*H)}\), which for \(H := x_0 x_0^* - x_{\text{null}} x_{\text{null}}^*\) becomes \(\sqrt{||x_0||^4 + ||x_{\text{null}}||^4 - 2|x_0^* x_{\text{null}}|^2}\), after a simple calculation. The assertion then follows from the assumption \(||x_0|| = ||x_{\text{null}}||\).

On the other hand, since \(\text{Tr}(H) = ||x_0||^2 - ||x_{\text{null}}||^2 = 0\) and \(\text{rank}(H) \leq 2\), the eigenvalues of \(H\) are of the form \(\pm \lambda\) for some \(\lambda \geq 0\), along with eigenvalue 0 of multiplicity \(n - 2\). Therefore the Frobenius norm of \(H\) is \(\sqrt{2\lambda}\) while the spectral norm of \(H\) is \(\lambda = \sqrt{||x_0||^4 - |x_0^* x_{\text{null}}|^2}\).

REFERENCES