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,

$$\|x_0x_0^* - x_{\text{null}}x_{\text{null}}^*\| = \sqrt{2(\|x_0\|^4 - |x_0^*x_{\text{null}}|^2)}$$

is the Frobenius norm of $x_0x_0^* - x_{\text{null}}x_{\text{null}}^*$, 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 $H := x_0x_0^* - x_{\text{null}}x_{\text{null}}^*$ 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

[1] P. Chen, A. Fannjiang & G. Liu, *Phase Retrieval by Linear Algebra,* SIAM J. Matrix Anal. & Appl., 38 (2017), pp. 854-868.

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