Comments on "Necessary and Sufficient Conditions for the Hurwitz and Schur Stability of Interval Matrices"[1]

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***Abstract*—This note shows that Example 1 in the above paper[1] is not Hurwitz stable.**

Recently, Wang *et al.*[1] derived some new sufficient and necessary conditions for the Hurwitz and Schur stability of interval matrices. Based on these results, they developed an elegant algorithm to determine the Hurwitz and Schur stability properties of interval matrices. In this note, we show that their Example 1 is not Hurwitz stable.

Example 1: Wang *et al.*[1] claim that the interval matrix $[A^m\ A^M]$ where

$$A^m = \begin{bmatrix} -3 & 4 & 4 & -1 \\ -4 & -4 & -4 & 1 \\ -5 & 2 & -5 & -1 \\ -1 & 0 & 1 & -4 \end{bmatrix} \text{ and } A^M = \begin{bmatrix} -2 & 5 & 6 & 1.5 \\ -3 & -3 & -3 & 2 \\ -4 & 3 & -4 & 0 \\ 0.1 & 1 & 2 & 2.5 \end{bmatrix}$$

is Hurwitz stable. If we choose, however, a matrix in $[A^m\ A^M]$ as

$$A = \begin{bmatrix} -2.5 & 4.5 & 5 & 0.25 \\ -3.5 & -3.5 & -3.5 & 1.5 \\ -4.5 & 2.5 & -4.5 & -0.5 \\ -0.45 & 0.5 & 1.5 & 0.875 \end{bmatrix}$$

then it is seen that matrix A with the eigenvalues at 0.6696, -2.7173, and $-3.7887 \pm j6.7546$ is unstable. Therefore the conclusion of Wang *et al.*[1] is incorrect.

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[1] K. Wang, A. N. Michel, and D. Liu, *IEEE Trans. Automat. Contr.*, vol. 39, pp. 1250–1255, June 1994.

Correction to "Necessary and Sufficient Conditions for the Hurwitz and Schur Stability of Interval Matrices"[1]

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In the above paper,[1] Example 1, the last entry in matrix A^M should be -2.5 instead of 2.5. This is a typographical error and in no way does it alter the validity of the results.

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[1] K. Wang, A. N. Michel, and D. Liu, *IEEE Trans. Automat. Contr.*, vol. 39, no. 6, pp. 1251–1255, June 1994.