

Erratum

for the paper D. Henrion, D. Peaucelle, D. Arzelier, M. Šebek, Ellipsoidal Approximation of the Stability Domain of a Polynomial, Proceedings of the European Control Conference, EUCA, pp. 384-389, Porto, Portugal, September 2001, and IEEE Transactions on Automatic Control, Vol. 48, No. 12, pp. 2255–2259, December 2003.

I am grateful to Taner Buyukkoroglu for raising the following points :

First, there is an ambiguity in the definition of matrix \mathbf{H} . The reader may understand that matrices $H_{ij} \in \mathbb{R}^{n \times n}$, $i, j = 0, \dots, n$ constitute a block partitioning of matrix $\mathbf{H} \in \mathbb{R}^{n(n+1) \times n(n+1)}$. However, this is not correct. Denoting a block partitioning of \mathbf{H} by $\mathbf{H}_{ij} \in \mathbb{R}^{(n+1) \times (n+1)}$, and the (i, j) entry in matrix $H(x)$ by $[H(x)]_{ij}$, the following identity holds

$$\mathbf{x}'\mathbf{H}_{ij}\mathbf{x} = [H(x)]_{ij}, \quad i, j = 1, \dots, n.$$

Second, some matrix dimensions are inconsistent in the proof of the main result. Indeed, the sequence leading to the implication that $H(x) \succ 0$ for all vectors x such that $P(x) \geq 0$ should be written

$$\begin{aligned} (I_n \otimes \mathbf{x})'(\mathbf{D} \otimes I_{n+1})\mathbf{H}(I_n \otimes \mathbf{x}) &= \\ (\mathbf{D} \otimes \mathbf{x}')\mathbf{H}(I_n \otimes \mathbf{x}) &= \\ \mathbf{D}H(x) &\succ \begin{matrix} (I_n \otimes \mathbf{x})'(I_n \otimes \mathbf{P} + \mathbf{G})(I_n \otimes \mathbf{x}) \\ I_n \otimes P(x). \end{matrix} \end{aligned}$$

Then $H(x) \succ \mathbf{D}^{-1} \otimes P(x)$ and the desired implication follows.

Didier Henrion, Toulouse, January 2010.