Erratum to "A Distributed Algorithm for Average Consensus on Strongly Connected Weighted Digraphs" [Automatica 50 (3) (2014) 946-951]

Attilio Priolo [a] Andrea Gasparri [a] Eduardo Montijano [b,c] Carlos Sagues [c]

[a] *Department of Engineering, Roma Tre University, Rome, Italy.*

[b] *Centro Universitario de la Defensa (CUD), Zaragoza, Spain.*

[c] *Instituto de Investigación en Ingeniería de Aragón (I3A), Universidad de Zaragoza, Spain.*

The purpose of this note is to correct Proposition 3 in Priolo et al. (2014), where the diagonalizability of the matrix $\mathcal{C}$ needs to be considered in the Assumptions of Proposition 3. More precisely, it should reads as follows.

Proposition 3 *Let us assume the multi-agent system applies the modified consensus algorithm give in eq. (8)* with the Perron matrix $\mathcal{C}$ diagonalizable. *Then, the disagreement vector $\varphi(k)$ can be bounded as:*

$$\|\varphi(k)\| \leq \chi_1 \, k|\lambda_{\mathcal{C}_2}|^k + \chi_2|\lambda_{\mathcal{C}_2}|^k,$$

with $\|\cdot\|$ the Euclidean norm and χ_1, $\chi_2 \in \mathbb{R}$ two positive constant values.

Proof:

The proof is the same as presented in Proposition 3 in Priolo et al. (2014), where the diagonalizability of matrix $\mathcal{C}$ is used to introduce γ_1 in eq.(12).

Further, the bound to t_{211} in the second equation of the right column in page 949 has to be re-derived, and corrected to

$$\begin{aligned} t_{211} &\leq \sqrt{n} \left\| \epsilon(j) - \mathbf{w}^T \epsilon(j) \, \mathbf{1} \right\|_\infty \\ &\leq 2\sqrt{n} \max_i |x_i(0)| \underbrace{\max_i \left| \frac{\delta_{ii}(j-1) - \delta_{ii}(j)}{n \, \delta_{ii}(j) \, \delta_{ii}(j)} \right|}_{t_{2111}}. \end{aligned}$$

Thus, the constant χ_{11} in eq. (14) becomes

$$\chi_{11} = 2 \max_i |x_i(0)| \, \frac{\gamma_1 \left(1 + \dfrac{1}{|\lambda_{\mathcal{C}_2}|}\right) \sqrt{2}}{n \, \bar{d}^2}. \qquad \square$$

Email addresses: priolo@dia.uniroma3.it (Attilio Priolo), gasparri@dia.uniroma3.it (Andrea Gasparri), emonti@unizar.es (Eduardo Montijano), csagues@unizar.es (Carlos Sagues).

References

A. Priolo, A. Gasparri, E. Montijano, and C. Sagues. A distributed algorithm for average consensus on strongly connected weighted digraphs. *Automatica*, 50(3):946 – 951, 2014.