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Erratum: “Anticipating synchronization of chaotic Lur’e systems” [Chaos 17, 013117 (2007)]

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I. INTRODUCTION

It has been brought to our attention that there is a small yet annoying error in our manuscript “Anticipating synchronization of chaotic Lur’e systems.”1 It is the purpose of this note to provide a complete correction.

II. ERRATA

In the integral in the expression of $\hat{V_2}(e_i)$ in Eq. (B5), the following terms are missing: $2\overline{\gamma} \overline{\psi}(x(t),e(t))B^TZA_0e(t)$ and $2\overline{\gamma} \overline{\psi}(x(t),e(t))B^TZA_1e(t-\tau)$. As a consequence, the matrix $\Lambda_1$ at the bottom of page 11 should become

$$\begin{pmatrix}
A_0^TZA_0 & A_0^TZA_1 & A_0^TZB - Y \\
A_1^TZA_0 & A_1^TZA_1 & A_1^TZB - W \\
B^TZA_0 & B^TZA_1 & B^TZB - Y
\end{pmatrix},$$

and the linear matrix inequality (LMI) [Eq. (B2)] can be simplified to

$$\begin{pmatrix}
PA_0 + A_0^TP + Y + Y^T + Q & PA_1 - Y + W^T & PB + \gamma \lambda C^T - \overline{\gamma} Y & \overline{\gamma} A_0^TZ \\
A_1^TP - Y^T + W & -Q - W - W^T & 0 & -\overline{\gamma} W & \overline{\gamma} A_1^TZ \\
B^TP + \gamma \lambda C & 0 & -2\lambda & 0 & -\overline{\gamma} B^TZ \\
-\overline{\gamma} Y^T & -\overline{\gamma} W^T & 0 & -\overline{\gamma} Z & 0 \\
\overline{\gamma} ZA_0 & \overline{\gamma} ZA_1 & \overline{\gamma} ZB & 0 & -\overline{\gamma} Z
\end{pmatrix} < 0.$$

The formulation of Theorem 3 then becomes as follows.

**Theorem 3:** Let $\overline{\gamma} > 0$ be given. Assume that there exist scalars $\alpha, \lambda > 0$ and matrices $P > 0$, $Q > 0$, $X$, $Y$, and $W$ such that the following LMI holds:

$$\begin{pmatrix}
PA + A_0^TP + Y + Y^T + Q & X - Y + W^T & PB + \gamma \lambda C^T - \overline{\gamma} Y & \alpha \overline{\gamma} A_0^TP \\
X^T - Y^T + W & -Q - W - W^T & 0 & -\overline{\gamma} W & \alpha \overline{\gamma} X^T \\
B^TP + \gamma \lambda C & 0 & -2\lambda & 0 & \alpha \overline{\gamma} B^TP \\
\alpha \overline{\gamma} PA & \alpha \overline{\gamma} X & \alpha \overline{\gamma} PB & 0 & -\alpha \overline{\gamma} P
\end{pmatrix} < 0.$$

Define the matrices

$$N := \begin{pmatrix}
-\gamma & \alpha \overline{\gamma} P \\
-W & \alpha \overline{\gamma} X \\
0 & \alpha \overline{\gamma} B^TP
\end{pmatrix}, \quad \Pi := -\alpha \text{diag}(P,P),$$

$$\Delta := N \Pi^{-1} N^T,$$

and let $\overline{\gamma}^*$ be the minimum eigenvalue of the matrix pencil $(\Gamma, -\Delta)$. Then $\overline{\gamma}^* > \overline{\gamma}$ and for $M = P^{-1}X$ the dynamics (19) are asymptotically stable for every $0 < \tau < \overline{\gamma}^*$. 

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\begin{footnotesize}
\begin{enumerate}
\item H. Huijberts, H. Nijmeijer, and T. Oguchi, Chaos \textbf{17}, 013117 (2007).
\item P. J. Neefs (private communication).
\end{enumerate}
\end{footnotesize}