Erratum: "Anticipating synchronization of chaotic Lur'e systems" [Chaos 17, 013117 (2007)]

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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.” It is the purpose of this note to provide a complete correction.

II. ERRATA

In the integral in the expression of $\dot{V}_2(e)$ in Eq. (B5), the following terms are missing: $2\tilde{\nu}(\chi(t), e(t))B^TZA_0e(t)$ and $2\tilde{\nu}(\chi(t), e(t))B^TZA_1e(t-\tau)$. As a consequence, the matrix $\Lambda_1$ at the bottom of page 11 should become

$$
\Lambda_1 = \begin{pmatrix}
A^T_0ZA_0 & A^T_0ZA_1 & A^T_0ZB - Y \\
A^T_1ZA_0 & A^T_1ZA_1 & A^T_1ZB - W \\
B^TZA_0 & B^TZA_1 & B^TZB & 0
\end{pmatrix},
$$

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

$$
\begin{pmatrix}
PA_0 + A^T_0P + Y + Y^T + Q & PA_1 - Y + W^T & PB + \gamma\lambda C^T - \tilde{\gamma}Y & \tilde{\gamma}A^T_0Z \\
A^T_1P - Y^T + W & -Q - W - W^T & 0 & -\tilde{\gamma}W & \tilde{\gamma}A^T_1Z \\
B^T + \gamma\lambda C & 0 & -2\lambda & 0 & \tilde{\gamma}B^TZ \\
-\tilde{\gamma}ZA_0 & \tilde{\gamma}ZA_1 & \tilde{\gamma}ZB & 0 & -\tilde{\gamma}Z
\end{pmatrix} < 0.
$$

The formulation of Theorem 3 then becomes as follows.

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

$$
\begin{pmatrix}
PA + A^T_0P + Y + Y^T + Q & X - Y + W^T & PB + \gamma\lambda C^T - \tilde{\gamma}Y & \alpha\tilde{\gamma}A^T_0P \\
X^T - Y^T + W & -Q - W - W^T & 0 & -\alpha\tilde{\gamma}X \\
B^T + \gamma\lambda C & 0 & -2\lambda & 0 & \alpha\tilde{\gamma}B^T P \\
\alpha\tilde{\gamma}PA & \alpha\tilde{\gamma}X & \alpha\tilde{\gamma}PB & 0 & -\alpha\tilde{\gamma}P
\end{pmatrix} < 0.
$$

Define the matrices

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

$$
\Gamma := \begin{pmatrix}
PA + A^T_0P + Y + Y^T + Q & X - Y + W^T & PB + \gamma\lambda C^T \\
X^T - Y^T + W & -Q - W - W^T & 0 \\
B^T + \gamma\lambda C & 0 & -2\lambda
\end{pmatrix}, \quad \Delta := \Pi N^{-1} N^T,
$$

and let $\tau^*$ be the minimum eigenvalue of the matrix pencil $(\Gamma, -\Delta)$. Then $\tau^* > \tilde{\tau}$ and for $M=P^{-1}X$ the dynamics (19) are asymptotically stable for every $0 < \tau < \tau^*$.
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\(^1\)H. Huijberts, H. Nijmeijer, and T. Oguchi, Chaos 17, 013117 (2007).
\(^2\)P. J. Neefs (private communication).