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Corrigendum to "A time-scale variational approach to inflation, unemployment and social loss"

by

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Abstract: The aim of this note is to point out an error in the empirical results reported in Section 4.2 of our paper, published in *Control and Cybernetics*, 42 (2013), no. 2, 399–418.

We regret to announce that there was an error in the Maple computer file that was used to compute the values for the Example 7 of Dryl, Malinowska and Torres (2013), which adversely affects the results of the paper. Our aim is to clarify here this matter.

Example 7 of Dryl, Malinowska and Torres (2013) is based on real data: the rate of inflation p and the rate of unemployment u, taken respectively from *InflationData.com* and *UnemploymentData.com*, and which were being collected each month in the USA over 11 years, from 2000 to 2010. The time-scale economic model given in Section 4.1 of Dryl, Malinowska and Torres (2013) is

$$\mathcal{L}(\pi) = \int_0^T L\left(t, \pi(t), \pi^{\Delta}(t)\right) \Delta t \longrightarrow \min$$

subject to boundary conditions

$$\pi(0) = \pi_0, \quad \pi(T) = \pi_T,$$

where the Lagrangian L is given by

$$L(t, \pi(t), \pi^{\Delta}(t)) = \left[\left(\frac{\pi^{\Delta}(t)}{\beta j}\right)^2 + \alpha\left(\frac{\pi^{\Delta}(t)}{j} + \pi(t)\right)^2\right] e_{\ominus\delta}(t, 0).$$

All parameters of this model, that is, β, j, α and δ, are specified in Section 4.2 of Dryl, Malinowska and Torres (2013). The characteristic equation of the Euler–Lagrange equation associated to this problem is given in Example 7 of Dryl, Malinowska and Torres (2013), namely:

$$\lambda^2 + \frac{A}{\Omega}\lambda - \frac{B}{\Omega} = 0. \tag{1}$$

The characteristic roots λ_1 and λ_2 of (1) are of different signs. They are presented correctly on page 410 of Dryl, Malinowska and Torres (2013) but, unfortunately, they were coded incorrectly in the Maple computer file. It turns out that the wrong values for the characteristic roots lead to very interesting results, while this is not the case with the correct ones. The wrong values used in the Maple computer file were

$$\lambda_1(h) = \frac{\frac{11}{8} + \frac{81h}{32} + \frac{1}{2}\sqrt{4\frac{(-\frac{11}{8} - \frac{81h}{32})^2}{(\frac{11}{2} - \frac{27h}{8})^2} + \frac{54}{\frac{11}{2} - \frac{27h}{8}}}}{11 - \frac{27h}{4}}$$

and

$$\lambda_2(h) = \frac{\frac{11}{8} + \frac{81h}{32} - \frac{1}{2}\sqrt{4\frac{(-\frac{11}{8} - \frac{81h}{32})^2}{(\frac{11}{2} - \frac{27h}{8})^2} + \frac{54}{\frac{11}{2} - \frac{27h}{8}}}}{11 - \frac{27h}{4}}.$$

References

M. Dryl, A. B. Malinowska, D. F. M. Torres (2013) A time–scale variational approach to inflation, unemployment and social loss. *Control and Cybernetics* **42**, 2, 399–418.