Erratum and addendum: Period of homogeneous oscillations in the ferroin catalyzed Zhabotinskii system [J. Chem. Phys. 71, 4669 (1979)]

M-L. Smoes

Department of Chemistry, The University of Michigan, Ann Arbor, Michigan 48109

In Appendix A, the comment following Eq. (A5) should obviously be that the period reaches a minimum (rather than a maximum) of $2\pi/a$ for $z_1=0$. At the end of the same Appendix, the expressions given for X_{max} and Y_{max} are not correct. Indeed, for any value of z_1,

$$Y^2_{max}=\frac{\mu^2}{2}\left(\frac{\mu^4\pm 2\mu^2(a^2-\omega^2)^{1/2}+4a^2}{\mu^4+4a^2}\right)$$

$$X^2_{max}=\frac{\mu^2}{2}\left(\frac{\mu^4\mp 2\mu^2(a^2-\omega^2)^{1/2}+4a^2}{\mu^4+4a^2}\right)$$

with the upper sign for $z_1>0$. In terms of the model parameters E_2, E_1, and a

$$\mu^2\equiv E_2+E_1$$

$$\omega=a(1-z_1^2)^{1/2}$$

$$z_1\equiv(E_2-E_1)/2a\ .$$

In the limit $|z_1|\to 0$, $\omega\to a$, and the amplitudes are given by

$$\lim_{\substack{|z_1|\to 0\\ \omega\to a}} Y^2_{max}=\lim_{\substack{|z_1|\to 0\\ \omega\to a}} X^2_{max}=\mu^2/2$$

Near the saddle–node transition, in the limit $|z_1|\to 1$, $\omega\to 0$ and the amplitudes are related to the parameters as

$$\lim_{\substack{|z_1|\to 1\\ \omega\to 0}} Y^2_{max}=\frac{\mu^2}{2}\left(1\pm\frac{2\mu^2a}{\mu^4+4a^2}\right)$$

$$\lim_{\substack{|z_1|\to 1\\ \omega\to 0}} X^2_{max}=\frac{\mu^2}{2}\left(1\mp\frac{2\mu^2a}{\mu^4+4a^2}\right)$$

with the upper sign for $z_1>0$. The increase in amplitude with an increase in μ^2 is illustrated in Fig. 1. The waveform shows the highly relaxational character of the symmetric Bautin oscillations near the saddle–node transition ($|z_1|\to 1$). The bistability which will appear at $|z_1|\geq 1$ is already apparent in the upper and lower plateaux of these relaxational oscillations. In the asymmetrical system, there is only one plateau and the transition is to a monostable system.[1]

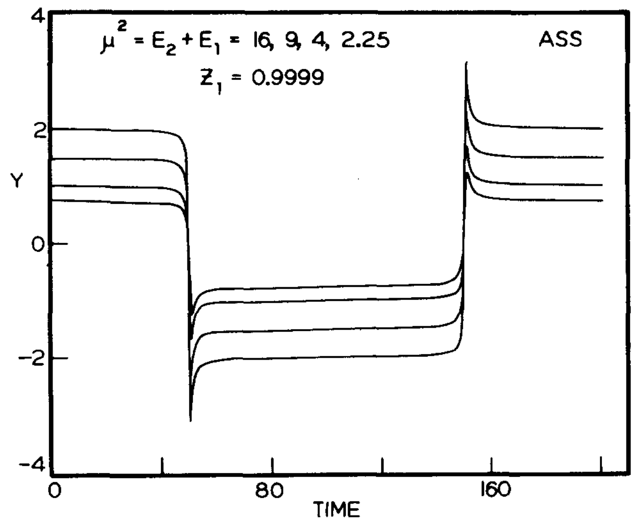

FIG. 1. Symmetric Bautin model. Increase in amplitude of Y with an increase in $\mu^2=E_2+E_1$. Relaxational oscillation at $z_1=0.9999$. (At $z_1=1$, the system becomes bistable.)

[1]M-L. Smoes, *Dynamics of Synergetic Systems*, Springer series in Synergetics, edited by H. Haken (Springer, New York, 1980), Vol. 6, pp. 80–96.

 0021-9606/80/172522-01$00.00