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Erratum: Bifurcations of One- and Two-Dimensional Maps

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ERRATUM

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Bifurcations of one- and two-dimensional maps

By P. Holmes and D. Whitley

The normal form computations of resonant bifurcations reported in the Appendix of the paper are incorrect, and remarks in §4.2 (p. 75, ¶ 2) relating to them are consequently also in error. The corrected computation yields

$$b_1(0,0) = \text{Im}\,(\alpha(0,0)\,\bar{\lambda}(0,0))$$
$$= -\frac{1}{16\sin^2\theta}\left\{\frac{3\sin\theta}{1-\cos\theta}+\frac{\sin 3\theta}{1-\cos 3\theta}\right\}. \tag{1}$$

The formulae for $\alpha(0,0)$, below (A 2), and for ξ_{11} (equation (A 5)) are also incorrect; they should read

$$\alpha(0,0) = \xi_{11}\,\xi_{20}\frac{(2\lambda-1)}{\lambda(1-\lambda)}+\frac{|\xi_{11}|^2}{1-\lambda}+\frac{2|\xi_{02}|^2}{\lambda^2-\bar{\lambda}}+\xi_{21} \tag{2}$$

and

$$\xi_{11} = -\frac{1}{2\sin\theta}. \tag{3}$$

Examining (1), we find that $b_1(0,0) < 0$ for all $\theta \in (0,\theta^*) \cup (\frac{2}{3}\pi,\pi)$, and $b_1(0,0) > 0$ for $\theta \in (\theta^*, \frac{2}{3}\pi)$, where $\theta^* \approx 1.824$ radians ($\cos\theta^* = -\frac{1}{4}$). Thus, using (4.6) from the paper, or the simpler expression

$$1+\mu = (1-\cos\theta)^2, \tag{4}$$

where the eigenvalues are $\lambda, \bar{\lambda} = \cos\theta \pm \mathrm{i}\sin\theta$, we find that $b_1(0,0) < 0$ for $\mu \in (-1, \frac{9}{16}) \cup (\frac{5}{4}, 3)$ and $b_1(0,0) > 0$ for $\mu \in (\frac{9}{16}, \frac{5}{4})$. It follows that there is an open interval of μ-values for which the resonant bifurcations are *subcritical*, and occur to the *left* of the points $(\mu(p,q), 1)$. We intend to report on the implications of this bifurcation reversal at a later date; also see Holmes & Williams (1984) for more information.

Reference

Holmes, P. J. & Williams, R. F. 1984 Knotted periodic orbits in suspensions of Smale's horseshoe: torus knots and bifurcation sequences. (Submitted for publication.)