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Corrigendum

# Corrigendum to "Multiple transverse homoclinic solutions near a degenerate homoclinic orbit" [J. Differential Equations 259 (2015) 1–24]

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The authors sincerely apologize for the error in counting the codimension of bifurcations in the above published paper, which will be called [LLZ] for short.

First, to fix the paper [LLZ], we look for bifurcations of heteroclinic solutions $x(t) = \gamma_\mu$, rather than the homoclinic solutions as in [LLZ]. And the bifurcated heteroclinic solutions $x(t)$ are close to $\gamma(t)$ as a function to another function, without a phase shift. That is $x(t) = \gamma(t) + z(t)$ where $z(0) \perp \dot\gamma(0)$.

Second, we assume the heteroclinic solution connects two hyperbolic equilibria $u = 0$ to $u = A$, i.e., $\gamma(-\infty) = 0$, $\gamma(\infty) = A$, with $\mathrm{Re}\{\sigma(Df(0))\} \neq 0$, $\mathrm{Re}\{\sigma(Df(A))\} \neq 0$. Let $Lu := u' - Df(\gamma(t))u$. Let $N(L)$ and $N(L^*)$ be the null spaces of $L$ and its adjoint operator $L^*$. If $d$ is the dimension of $N(L)$ and $d^*$ is the dimension of $N(L^*)$, then the index of the Fredholm operator $L$ is $I(L) := d - d^*$. The basic change in this corrigendum is the following hypothesis:

(H) $d = 3, d^* = 2$, and $I(L) = 1$.

Let $N(L)$ be spanned by $(u_1, u_2, u_3)$ with $u_3 = \dot\gamma(t)$, and $N(L^*)$ be spanned by $(\psi_1, \psi_2)$. Let $K : R(L) \to N(L)^\perp$ be a particular solution map to the equation $L(z) = h$, where $h \in R(L)$. With the phase condition $z(0) \perp \dot\gamma(0)$, the general solution to $L(z) = h$, $h \in R(L)$ is $z = \sum_{p=1,2} \beta_p u_p + Kh$.

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Finally, we should emphasize that in (4.7), (5.1) or (5.4) of [LLZ], $\{u_p,\ p = 1, 2\}$ does not contain $\dot{\gamma}(t)$. With this in mind, the method of [LLZ] applies word for word to the heteroclinic bifurcation problem described above.

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