ERRATA

Correction to

A CYCLIC INEQUALITY AND A RELATED EIGENVALUE PROBLEM

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Professor P. Nowosad, Rio de Janeiro, has informed us that the inequality $S(\underset{\sim}{x}) \geqslant N/2$ holds for $N = 12$ [1]. Furthermore, our belief that the inequality also holds for odd $N \leqq 23$ has been stated, and strongly supported by numerical evidence, in [2].

1. E. K. Godunova and V. I. Levin, *A cyclic sum with* 12 *terms*, Mathematical Notes of the Academy of Sciences of the USSR, **19** (1976), 510-517. (translation), Consultants Bureau, New York.
2. P. J. Bushell and A. H. Craven, *On Shapiro's cyclic inequality*, Proc. Royal Soc. Edinburgh, 75A, **26** (1975/76), 333-338.

Corrections to

CHARACTERIZATION OF A CLASS OF TORSION FREE GRUOPS IN TERMS OF ENDOMORPHISMS

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Corrections to

NONOPENNESS OF THE SET OF THOM-BOARDMAN MAPS

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In [3] we showed that the set of Thom-Boardman maps is open if the Morin ($S_{1;k}$) singularities alone occur generically, and is not open if S_2 singularities occur generically. However, we neglected to consider the $S_{1,i}$ singularities, $i \geqq 2$ (recall that the subscripts denote corank, not kernel rank, and that $S_{1;k}$ means $S_{1,1,\ldots,1}$ with k 1's). In fact, the set of Thom-Boardman maps is not open if the $S_{1,2}$ singularities occur generically, which occurs whenever $n > p \geqq 4$. Thus Theorem 1.1 of [3] should be stated: The Thom-Boardman maps form an open subset of $C(N, P)$ iff either $2p > 3n - 4$ or $p < 4$.

We will now indicate how the above claims are proved. Using Proposition 3 of [2], it is easy to calculate that the codimension of $S_{1,2}$ (which Mather denotes $\sum^{n-p+1,2}$; we assume $n>p$) is $n - p + 4$. Thus $S_{1,2}$ singularities occur generically iff $n > p \geqq 4$.

The 3-jet at 0 of

$$f(x_1, \cdots, x_n) = (x_1, \cdots, x_{p-1}, x_p^2 + \cdots + x_{n-2}^2 + x_{n-1}^2 x_n + x_1 x_{n-1} + x_2 x_n + x_3 x_n^2)$$

lies in $S_{1,2,0} \cap {}_tS_{1,2}$. That it lies in $S_{1,2,0}$ follows from Mather's algorithm for computing the Thom-Boardman type (see the last definition on p. 236 of [2]). That $j^2 f$ is transverse to $S_{1,2}$ follows from the last paragraph in [2].

For each k, $z = j^k f(0)$ lies in the closure of $S_{1;k}$. To see this, note that the contact class of $x^2 y + Q$, Q a nondegenerate quadratic form in other variables, lies in the closure of the contact class of $x^2 y - y^k + Q$ (consider the curve $x^2 y - ty^k + Q$). By Table 3 of [1], the latter contact class lies in the closure of the contact class of $x^2 + y^{k+1} + Q$, which lies in $S_{1;k}$.

By the Transversal Extension Theorem of [3], there is a Thom-Boardman map g with $j^k g(0) = z$. By Lemma 3.5 of [3], there are maps g_m which converge to g in the Whitney C^∞ topology such that each g_m has $S_{1;k}$ singularities. The codimension of $S_{1;k}$ is $n - p + k$. Thus, choosing $k > p$, g_m cannot be a Thom-Boardman map.

REFERENCES

1. J. Callahan, *Singularities and plane maps II: sketching catastrophes*, Amer. Math. Monthly, **84** (1977), 765–803.

2. J. Mather, *On Thom-Boardman Singularities, Dynamical Systems*, Academic Press, New York, 1973.

3. L. Wilson, *Non-openness of the set of Thom-Boardman maps*, Pacific J. Math.