

Pacific Journal of Mathematics

**CORRECTIONS TO: “NONOPENNESS OF THE SET OF
THOM-BOARDMAN MAPS”**

LESLIE WILSON

ERRATA

Correction to

A CYCLIC INEQUALITY AND A RELATED EIGENVALUE PROBLEM

J. L. SEARCY AND B. A. TROESCH

Volume 81 (1979), 217-226

Professor P. Nowosad, Rio de Janeiro, has informed us that the inequality $S(x) \geq N/2$ holds for $N = 12$ [1]. Furthermore, our belief that the inequality also holds for odd $N \leq 23$ 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 GROUPS IN TERMS OF ENDOMORPHISMS

E. F. CORNELIUS, JR.

Volume 79 (1978), 341-355

Received February 5, 1974 and in revised form June 7, 1978.

Corrections to

NONOPENNESS OF THE SET OF THOM-BOARDMAN MAPS

LESLIE C. WILSON

Volume 84 (1979), 225-232

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, $i \geq 2$ (recall that the subscripts denote corank, not kernel rank, and that $S_{1;k}$ means $S_{1,1,\dots,1}$ 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 $n > p \geq 4$. 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 $n > p \geq 4$.

The 3-jet at 0 of

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

lies in $S_{1,2,0} \cap {}_t S_{1,2}$. 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 $x^2 y - t y^k + Q$). 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.

PACIFIC JOURNAL OF MATHEMATICS

EDITORS

DONALD BABBITT (Managing Editor)

University of California
Los Angeles, CA 90024

HUGO ROSSI

University of Utah
Salt Lake City, UT 84112

C. C. MOORE and ANDREW OGG

University of California
Berkeley, CA 94720

J. DUGUNDJI

Department of Mathematics
University of Southern California
Los Angeles, CA 90007

R. FINN and J. MILGRAM

Stanford University
Stanford, CA 94305

ASSOCIATE EDITORS

E. F. BECKENBACH

B. H. NEUMANN

F. WOLF

K. YOSHIDA

SUPPORTING INSTITUTIONS

UNIVERSITY OF BRITISH COLUMBIA
CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIVERSITY OF CALIFORNIA
MONTANA STATE UNIVERSITY
UNIVERSITY OF NEVADA, RENO
NEW MEXICO STATE UNIVERSITY
OREGON STATE UNIVERSITY
UNIVERSITY OF OREGON

UNIVERSITY OF SOUTHERN CALIFORNIA
STANFORD UNIVERSITY
UNIVERSITY OF HAWAII
UNIVERSITY OF TOKYO
UNIVERSITY OF UTAH
WASHINGTON STATE UNIVERSITY
UNIVERSITY OF WASHINGTON

The Supporting Institutions listed above contribute to the cost of publication of this Journal, but they are not owners or publishers and have no responsibility for its content or policies.

Mathematical papers intended for publication in the *Pacific Journal of Mathematics* should be in typed form or offset-reproduced, (not dittoed), double spaced with large margins. Please do not use built up fractions in the text of the manuscript. However, you may use them in the displayed equations. Underline Greek letters in red, German in green, and script in blue. The first paragraph or two must be capable of being used separately as a synopsis of the entire paper. Please propose a heading for the odd numbered pages of less than 35 characters. Manuscripts, in triplicate, may be sent to any one of the editors. Please classify according to the scheme of Math. Reviews, Index to Vol. 39. Supply name and address of author to whom proofs should be sent. All other communications should be addressed to the managing editor, or Elaine Barth, University of California, Los Angeles, California, 90024.

50 reprints to each author are provided free for each article, only if page charges have been substantially paid. Additional copies may be obtained at cost in multiples of 50.

The *Pacific Journal of Mathematics* is issued monthly as of January 1966. Regular subscription rate: \$84.00 a year (6 Vols., 12 issues). Special rate: \$42.00 a year to individual members of supporting institutions.

Subscriptions, orders for numbers issued in the last three calendar years, and changes of address should be sent to Pacific Journal of Mathematics, P.O. Box 969, Carmel Valley, CA 93924, U.S.A. Older back numbers obtainable from Kraus Periodicals Co., Route 100, Millwood, NY 10546.

PUBLISHED BY PACIFIC JOURNAL OF MATHEMATICS, A NON-PROFIT CORPORATION

Printed at Kokusai Bunken Insatsusha (International Academic Printing Co., Ltd.).
8-8, 3-chome, Takadanobaba, Shinjuku-ku, Tokyo 160, Japan.

Copyright © 1979 by Pacific Journal of Mathematics
Manufactured and first issued in Japan

Charles A. Akemann and Steve Wright, <i>Compact and weakly compact derivations of C^*-algebras</i>	253
Dwight Richard Bean, Andrzej Ehrenfeucht and George Frank McNulty, <i>Avoidable patterns in strings of symbols</i>	261
Richard Clark Brown, <i>Notes on generalized boundary value problems in Banach spaces. I. Adjoint and extension theory</i>	295
Kenneth Alexander Brown and John William Lawrence, <i>Injective hulls of group rings</i>	323
Jacob Burbea, <i>The Schwarzian derivative and the Poincaré metric</i>	345
Stefan Andrus Burr, <i>On the completeness of sequences of perturbed polynomial values</i>	355
Peter H. Chang, <i>On the characterizations of the breakdown points of quasilinear wave equations</i>	361
Joseph Nicholas Fadyn, <i>The projectivity of $\text{Ext}(T, A)$ as a module over $E(T)$</i>	383
Donald Eugene Maurer, <i>Arithmetic properties of the idèle discriminant</i>	393
Stuart Rankin, Clive Reis and Gabriel Thierrin, <i>Right subdirectly irreducible semigroups</i>	403
David Lee Rector, <i>Homotopy theory of rigid profinite spaces. I</i>	413
Raymond Moos Redheffer and Wolfgang V. Walter, <i>Comparison theorems for parabolic functional inequalities</i>	447
H. M. (Hari Mohan) Srivastava, <i>Some generalizations of Carlitz's theorem</i>	471
James Alan Wood, <i>Unbounded multipliers on commutative Banach algebras</i>	479
T. Yoshimoto, <i>Vector-valued ergodic theorems for operators satisfying norm conditions</i>	485
Jerry Searcy and B. Andreas Troesch, <i>Correction to: "A cyclic inequality and a related eigenvalue problem"</i>	501
Leslie Wilson, <i>Corrections to: "Nonopenness of the set of Thom-Boardman maps"</i>	501