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Erratum

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Published in:
Mathematical Programming

DOI:
[10.1007/s10107-011-0491-x](https://doi.org/10.1007/s10107-011-0491-x)

Publication date:
2012

Document Version
Early version, also known as pre-print

[Link to publication](#)

Citation for published version (HARVARD):

Gould, NIM & Toint, P 2012, 'Erratum: Nonlinear programming without a penalty function or a filter (Mathematical Programming (2010) 122 (155-196))', *Mathematical Programming*, vol. 131, no. 1-2, pp. 403-404. <https://doi.org/10.1007/s10107-011-0491-x>

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Corrigendum: Nonlinear programming without a penalty function or a filter

N. I. M. Gould, D. P. Robinson and Ph. L. Toint

7 February 2011

This note reports a correction to the results obtained by Gould and Toint (2010), in which an error was unfortunately discovered. The problem is in the proof of Lemma 3.10 of this reference, where it is claimed that Lemma 6.5.3 of Conn, Gould and Toint (2000) can be invoked to deduce that $\rho_k^c \geq \eta_2$, where ρ_k^c is a specific ratio of achieved to predicted reduction is constraint violation and η_2 is a constant in $(0, 1)$. As it turns out, the reasoning is only correct if the ratio $\|s_k\|/\|s_k^R\|$ is bounded above, where s_k is the step at iteration k and s_k^R is its projection onto the range of the transposed Jacobian J_k^T .

Handling the case where this ratio is unbounded above turned out to be surprisingly complex. In particular, this required considering separately the cases where the tangential component of the step at iteration k is large or small with respect to its normal component, where the meaning of “large” and “small” has to be defined very specifically. The convergence proof taking this distinction into account is therefore significantly more involved than the proof of Gould and Toint (2010), and cannot be presented in the form of a few corrections in the original text. The report Gould, Robinson and Toint (2011) proposes a corrected version of Gould and Toint (2010), where other minor improvements and updates have also been introduced, including fixing a problematic case where it was possible to skip the normal step computation although the current iterate was close to the current infeasibility limit.

References

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