Erratum to:

Improved enclosure for some parametric solution sets with linear shape

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Example 5 in the above mentioned paper [4] reports that the method of Neumaier and Pownuk [2] yields a worse enclosure of the united solution set to the considered parametric interval linear system than the single step parametric Bauer-Skeel method [5, 1] and the self-verified parametric fixed-point method (parametric Krawczyk iteration) [3]. This is not true and resulted from a bug in the software. All three methods yield interval vectors of similar quality for the considered example. Namely, the parametric Bauer-Skeel method executed in exact arithmetic gives the solution enclosure

$$([-3, 12], [-24, 18])^\top. \tag{1}$$

The parametric Krawczyk iteration expanded by iterative refinement with stopping criterion

$$\mathtt{dist}(\mathbf{x}^{\mathtt{new}}, \mathbf{x}^{\mathrm{old}}) <= \delta, \tag{2}$$

where δ specifies a desired accuracy (say $\delta = 10^{-5}$), delivers enclosure of (1) with accuracy δ, that is

$$([-3.0000125, 12, 0000125], [-24.00004428, 18.00004428])^\top.$$

The method of Neumaier and Pownuk, implemented with a the same stopping criterion above, yields the enclosure

$$([-3.00002019, 12, 00002019], [-24.00007190, 18.00007190])^\top.$$

It was also noticed that the formula in line -6 on page 1000 of the printed paper [4] also contains a bug and should be read as

$$|d| \quad = \quad |(D_0 - D)(RCb_0 + RCFq + RCL(D_0t + d) - t)|.$$

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References

[1] M. Hladík, Enclosures for the solution set of parametric interval linear systems, Int. J. Appl. Math. Comput. Sci. 22 (2012) (3) 561–574.

[2] A. Neumaier, and A. Pownuk, Linear systems with large uncertainties, with applications to truss structures, Reliable Computing 13 (2007) 149-172.

[3] E.D. Popova, Generalizing the parametric fixed-point iteration, Proceedings in Applied Mathematics & Mechanics 4 (2004) 680–681.

[4] E.D. Popova, Improved enclosure for some parametric solution sets with linear shape, Computers and Mathematics with Applications 68 (2014) 9, 994–1005.

[5] I. Skalna, A method for outer interval solution of systems of linear equations depending linearly on interval parameters, Reliable Computing 12 (2) (2006) 107–120.