Mathematical Programming manuscript No.
(will be inserted by the editor)

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Erratum: A superlinearly convergent predictor-corrector method for degenerate LCP in a wide neighborhood of the central path with $O(\sqrt{n}L)$-iteration complexity

Received: date / Revised version: date

Abstract. We correct an error in Algorithm 2 from [1]

Key words. linear complementarity problem, interior-point algorithm, large neighbourhood, superlinear convergence

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The higher order predictor (4.2) from [1] has to be modified in the degenerate case in order for the asymptotic convergence results from Lemma 4.5 and Theorem 4.6 to hold. More precisely equation (4.2) should be replaced by:

$$\begin{cases} su^1 + xv^1 = -(1+\epsilon)xs \\ Qu^1 + Rv^1 = 0 \end{cases},$$
$$\begin{cases} su^2 + xv^2 = \epsilon xs - u^1 v^1 \\ Qu^2 + Rv^2 = 0 \end{cases}, \tag{1}$$
$$\begin{cases} su^i + xv^i = -\sum_{j=1}^{i-1} u^j v^{i-j} \\ Qu^i + Rv^i = 0 \end{cases}, \quad i = 3, \ldots, m\,,$$

where

$$\epsilon = \begin{cases} 0\,, & \text{if HLCP is known to be nondegenerate} \\ 1\,, & \text{otherwise} \end{cases}. \tag{2}$$

In case the HLCP comes from an LP, then a strict complementarity solution is guaranteed to exist, and we should take $\epsilon = 0$. In general we do not know wether the HLCP is degenerate or not, so that we should take $\epsilon = 1$. The global convergence properties, including polynomial complexity, are the same for $\epsilon = 0$ and $\epsilon = 1$. If we take $\epsilon = 1$, then the duality gap converges to zero with Q-order $(m+1)/2$, both in the degenerate and the nondegenerate case. If the HLCP is nondegenerate and we take $\epsilon = 0$, then the Q-order of convergence is $m+1$.

The proof of the results stated above can be obtained by slightly modifying the original proofs in [1] . Complete proofs can be found in a technical report available at http://www.math.umbc.edu/~potra/predCorMPcor.pdf

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Mathematics Subject Classification (1991): 49M15, 65K05, 90C33

References

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