

Comments on the article: *Block preconditioners for the Marker-and-Cell discretization of the Stokes–Darcy equations*

Chen Greif* and Yunhui He†

July 15, 2024

After our article entitled *Block preconditioners for the Marker-and-Cell discretization of the Stokes–Darcy equations* (SIMAX Vol. 44(4), 1540–1565, 2023) was published, we have continued to work on this project, and have found a few places in the article where further clarifications were necessary, and a few minor typos had to be corrected. Below see a list of comments referring to those issues.

- p. 1547, line 9: change $B \in \mathbb{R}^{n^2 \times n^2}$ to $B \in \mathbb{R}^{n^2 \times (2n^2 - n)}$.
- p. 1548, lines -2 and -1: change $(G \ B^T)$ has a one-dimensional null space spanned by an all-ones vector of size $2n^2$ to $(G \ B^T)$ has a null vector spanned by an all-ones vector of size $2n^2$. The dimension of the null space is $n^2 - n + 1$.
- p. 1551, Theorem 4.1: the proof only shows that the algebraic multiplicities are *at least* as stated. It is challenging to fully establish the exact algebraic multiplicities analytically, but we have confirmed the statement of the theorem numerically.
- p. 1551, two lines above (4.5a): change $n^2 - n$ to $2(n^2 - n)$.

*The University of British Columbia, greif@cs.ubc.ca

†The University of Houston, yhe43@central.uh.edu