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Lei Cao* (leicaomath@gmail.com), **Selcuk Koyuncu** and **Timmothy Ryan Parmer**. *A Minimal Completion of Doubly Substochastic Matrix.*

Let B be an $n \times n$ doubly substochastic matrix and let s be the sum of all entries of B . In this paper we show that B has a sub-defect of k , which can be computed by taking the ceiling of $n - s$, if and only if there exists an $(n + k) \times (n + k)$ doubly stochastic extension containing B as a submatrix and k minimal. We also propose a procedure constructing a minimal completion of B , and then express it as a convex combination of partial permutation matrices. (Received September 20, 2016)