Michael Anastos* (manastos@zedat.fu-berlin.de). On a $k$-matching algorithm and finding $k$-factors in random graphs with minimum degree $k + 1$ in linear time.

We show that for $k + 1 \geq 3$ and $c > (k + 1)/2$ w.h.p. the random graph on $n$ vertices, $cn$ edges and minimum degree $k + 1$ contains a (near) perfect $k$-matching. As an immediate consequence we get that w.h.p. the $(k + 1)$-core of $G_{n,p}$, if non empty, contains a (near) spanning $k$-regular subgraph. This improves upon a result of Chan and Molloy and completely resolves a conjecture of Bollobás, Kim and Verstraëte. In addition, we show that such a subgraph can be found in a linear time w.h.p. A substantial element of the proof is the analysis of a randomized algorithm for finding $k$-matchings in random graphs with minimum degree $k + 1$. (Received August 18, 2020)