1145-68-1183 **James Allen Fill*** (jimfill@jhu.edu), The Johns Hopkins University, Dept. Applied Math. & Stat., Whitehead Hall, 3400 N. Charles St., Baltimore, MD 21218-2682, and **Wei-Chun Hung** (whung6@jhu.edu), The Johns Hopkins University, Dept. Applied Math. & Stat., Whitehead Hall, 3400 N. Charles St., Baltimore, MD 21218-2682. *Asymptotic bounds on the tails of the limiting QuickSort density.*

The randomized algorithm `QuickSort` is one of the great algorithms in computer science, and its computational efficiency continues to be the subject of deep analysis. It is well known that the normalized number of comparisons required by `QuickSort` to sort a file of n keys converges in distribution, with the limiting distribution possessing a density f that is infinitely smooth and positive everywhere on the real line.

We give upper and lower asymptotic bounds for the left tail and for the right tail of f that are nearly matching in each tail. The bounds strengthen results from a paper of Svante Janson (2015) concerning the corresponding distribution function F—and we substantially improve Janson's right-tail upper bound on F, as well. Furthermore, we obtain similar bounds on absolute values of derivatives of f of each order.

Using the refined asymptotic bounds on F, we derive right-tail large deviation (LD) results for the distribution of the number of comparisons required by `QuickSort` that sharpen somewhat the two-sided LD results of McDiarmid and Hayward (1996). (Received September 19, 2018)