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Dartmouth College, Hanover, NH 03755. *New results on an ancient function.*

I refer to the function of Pythagoras that sends  $n$  to  $s(n)$ , the sum of the divisors of  $n$  that are less than  $n$ . A still-open conjecture of Catalan & Dickson: each orbit in the  $s$ -dynamical system (i.e.,  $n, s(n), s(s(n)), \dots$ ) is bounded. Modeling such a sequence as a random geometric progression, Bosma & Kane showed that the average of  $\log(s(n)/n)$  for  $n$  even is a constant  $\lambda < 0$  (and for  $n$  odd, it's  $-\infty$ ). A new result: the average of  $\log(s(s(n))/s(n))$  for  $n$  even is also  $\lambda$ .

Pythagoras noted 2-cycles in the  $s$ -dynamical system, the so-called amicable numbers. It's been known since 1981 that the reciprocal sum of the amicable numbers is finite, and in 2011 Bayless & Klyve showed this sum is  $< 656,000,000$ . Recently with Nguyen we improved the bound to 222.

I also report on some new results with Pollack & Thompson on fibers of  $s$ . (Received September 09, 2017)