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*Differential equations related to averages of the  $k$ -th divisor function*

Keating, Rodgers, Roditty-Gershon, and Rudnick have given a conjecture for the asymptotic behaviour of the mean square of sums of the  $k$ -th divisor numbers over short intervals, and have proven formulas for the analogous problem over  $\mathbb{F}_q[t]$ . I will discuss their work and describe determinantal and differential equations related to their formulas.