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Asymptotics of divisor sums in short intervals, and a Painleve V equation

We discuss the piecewise polynomial functions $\gamma_k(c)$ that appear in the asymptotics of averages of the k-th divisor sum in short intervals, first studied by Keating, Rodgers, Roditty-Gershon, and Rudnick. Specifically, we express these polynomials as the inverse Fourier transform of a Hankel determinant that satisfies a Painlevé V equation. We prove that $\gamma_k(c)$ is very smooth at its transition points, and also determine the asymptotics of $\gamma_k(c)$ in a large neighbourhood of $k = c/2$.