NUMBER THEORY SEMINAR

Sums of Digits in q-ary Expansions

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WHEN: Thu 11 Sep. 2014, 2:30 p.m.

WHERE: Chase 319

ABSTRACT:

Let $s_q(n)$ denote the sum of the digits of a number n expressed in base q. We study here the ratio $\frac{s_q(n^\alpha)}{s_q(n)}$ for various values of q and α. In 1978, Kenneth B. Stolarsky showed that $\liminf_{n\to\infty} \frac{s_2(n^2)}{s_2(n)} = 0$ and that $\limsup_{n\to\infty} \frac{s_2(n^2)}{s_2(n)} = \infty$ using an explicit construction. We show that for $\alpha = 2$ and $q \geq 2$, the above ratio can in fact be any positive rational number. If time permits, we will also study what happens when α is a rational number that is not an integer, terminating the resulting expression by using the floor function.

Any questions, please e-mail: rnoble@mathstat.dal.ca.