1014-11-987 **Curtis Cooper*** (`cnc8851@cmsu2.cmsu.edu`), Dept. of Math. & Comp. Sci., Central Missouri State University, Warrensburg, MO 64093. *Bounds on a Remainder Term Associated with the Number of Base q Digits $\geq d$ Function.*

Let $q \geq 2$ be a fixed integer. The base q representation of a positive integer k can be written in the form

$$k = \sum_{r=0}^{\infty} a_r(q,k) q^r, \text{ where } a_r(q,k) \in \{0, 1, \ldots, q-1\}.$$

Let d be a nonzero base q digit. Define the 'number of base q digits $\geq d$' function as

$$\alpha_{\geq d}(q,k) = \sum_{r=0}^{\infty} [a_r(q,k) \geq d].$$

Here, we use Iverson's notation of putting brackets around a true-false statement. A bracketed true-false statement is 1 if the statement is true and 0 if it is false. For an integer $n \geq 1$, let

$$A_{\geq d}(q,n) = \sum_{k=1}^{n-1} \alpha_{\geq d}(q,k).$$

First, we will show that

$$A_{\geq d}(q,n) = \left(1 - \frac{d}{q}\right) n \log_q n + O(n).$$

Second, we define

$$S_{\geq d}(q,n) = A_{\geq d}(q,n) - \left(1 - \frac{d}{q}\right) n \lfloor \log_q n \rfloor$$

where $\log_q$ denote the logarithm function with base q and $\lfloor \cdot \rfloor$ denotes the greatest integer function. We then show that if

$$c > \max\left\{\frac{d}{q}, 1 - \frac{d}{q}\right\},$$

then

$$-c < \frac{S_{\geq d}(q,n)}{n} < 1 - \frac{d}{q}.$$

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