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On-line Algorithms for the q -adic Covering of the Unit Interval and for Covering a Cube by Cubes

We present efficient algorithms for the on-line q -adic covering of the unit interval by sequences of segments. The basic method guarantees covering provided the total length of segments is at least $1 + 2 \cdot \frac{1}{q} - \frac{1}{q^3}$. Other algorithms improve this estimate for $q \geq 6$. The unit d -dimensional cube can be on-line covered by an arbitrary sequence of cubes whose total volume is at least $2^d + \frac{5}{3} + \frac{5}{3} \cdot 2^{-d}$.