# Digital sequences with best possible order of $L_2$ discrepancy

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We consider the $L_2$ discrepancy of digital $(0,1)$–sequences over $\mathbb{Z}_2$ and give conditions on the generator matrix of such a sequence which guarantee minimal possible order of $L_2$ discrepancy of the generated sequence. We prove for the first time the existence of digital $(0,1)$–sequences over $\mathbb{Z}_2$ with $L_2$ discrepancy of order $\sqrt{\log N}/N$. This order is best possible by a result of K. Roth. Our existence proof is constructive.

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