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Baldwin Wallace University, Berea, OH 44130. *Asymptotic enumeration of difference matrices over  
cyclic groups*. Preliminary report.

We identify a relationship between a family of random walks on lattices and difference matrices over cyclic groups. By estimating the probabilities that these walks will return to their origins, we are able to exploit the aforementioned relationship to obtain the asymptotic number of difference matrices over cyclic groups as the number of columns increases but all other possible parameters remain fixed. Further, these return probability estimates are sufficiently sharp to provide proof of the existence of some previously-unknown difference matrices with certain parameter configurations. (Received July 14, 2015)