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New Constructions for Universal Cycles and de Bruijn Cycles

At the 2010 AMS/MAA meeting, Don Knuth described a construction for shorthand universal cycles of permutations that originated from CanaDAM 2007. Fixed-density de Bruijn cycles were constructed at CanaDAM 2009. We generalize these results: Given a multiset M containing f_i copies of i for $1 \leq i \leq n$, we construct shorthand universal cycles for the permutations of M . (Previous results use $f_i = 1$, and $n = 2$, respectively.) Collaborators: Alexander Holroyd, Frank Ruskey, Joe Sawada, Brett Stevens, Chi-Him Wong.