

1145-05-1736 **Michael T Engen*** (engenmt@uf1.edu). *Universal Permutations.*

The problem of finding a shortest permutation which contains all permutations of length n dates to 1999. While its length is known to be asymptotically quadratic in n , surprisingly little else is known. We prove a new constructive upper bound, as well as prove a formula for the exact length of the shortest permutation containing all emphlayered permutations of length n . (Received September 24, 2018)