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Megan M Bernstein* (bernstein@math.gatech.edu). *A Random Walk on S_n generated by Random Involutions.*

The involution walk is a random walk on the symmetric group generated by random involutions with 2-cycles distributed binomially with parameter p . Using spectral analysis, the involution walk is shown in this paper to mix for $p \geq \frac{1}{2}$ fixed, n sufficiently large in between $\log_{1/p}(n)$ steps and $\log_{2/(1+p)}(n)$ steps. The paper introduces a new technique for finding eigenvalues of random walks generated by many conjugacy classes using the character polynomial for the characters of the representations of the symmetric group. This is especially efficient at calculating the large eigenvalues of walks with generators with patterned cycle decompositions. The smaller eigenvalues are handled by developing monotonicity relations. These relations also give after sufficient time the likelihood order, the order from most likely to least likely state in the walk. The walk was introduced to study a conjecture about a random walk on the unitary group from the information theory of back holes. (Received September 11, 2015)