

1070-20-211

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Towards a cyclic version of Matsumoto's theorem. Preliminary report.

A classic result in Coxeter groups, often known as Matsumoto's theorem, states that any two reduced expressions of the same word differ by a sequence of braid relations. Cyclically shifting a reduced expression is a conjugation by the initial letter, so we ask the following question: "Do two cyclically reduced expressions of conjugate elements differ by a sequence of braid relations and cyclic shifts?" An affirmative answer would be a "cyclic version" of Matsumoto's theorem, and would be to the conjugacy problem what Matsumoto's theorem is to the word problem. Though it fails in general, it seems to "usually be true". In this talk, I will discuss our efforts to attack this problem and show some interesting algebraic combinatorics that has resulted. (Received February 12, 2011)