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The Poset of Shortest Paths in an Interval of the Bruhat Order

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A Coxeter group W is a group generated by reflections; examples are the symmetric group and the hyperoctahedral group. These groups have many interesting combinatorial properties. For instance, one can define a partial order, called the Bruhat order, on the elements of W. Let [u,v] be an interval in the Bruhat order. The Bruhat graph of [u,v], B(u,v), includes the Hasse diagram of the poset [u,v] with edges directed upwards, as well as other edges that I will describe in the talk. A u-v path is a chain in [u,v], but while not every u-v chain is a u-v path, every maximal u-v chain is such a path (of greatest length).

While the poset of maximal chains in [u,v] is well understood (it is the face poset of a regular cell decomposition of a sphere), not much is known about the other u-v paths in B(u,v). In this talk, we describe properties of the poset of shortest u-v paths.

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