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

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## Abstract for the Combinatorics and Algebra Seminars 2010 November 2

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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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Last update: **2020/01/29 19:03**

