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C-sortable words as green mutation sequences

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(Submitted on 30 Apr 2012)

Let Q be an acyclic quiver and s be a sequence s with elements in the vertex set Q_0 . We describe a sequence of simple (backward) tilting in the bounded derived category $D(Q)$, starting from the standard heart $H_Q = \text{mod} kQ$ and ending at the heart H_s in $D(Q)$. Then we interpret Keller's green mutation via King-Qiu's Ext-quiver of hearts, which provides a proof of Keller's theorem, that s is a green mutation sequence if and only if every heart in the simple tilting sequence is greater than or equal to $H_{Q[-1]}$; it is maximal if and only if $H_s = Q[-1]$. Further, fix a Coxeter element c in the Coxeter group W_Q of Q , which is admissible with respect to the orientation of Q . We show that the sequence induced by a c -sortable word w is a green mutation sequence. As a consequence, we obtain a bijection between the set of c -sortable words and finite torsion class in H_Q , which was first proved by Thomas and was also obtained by Amiot-Iyama-Reiten-Todorov. As byproducts, the interpretations of inversions, descents and cover reflections of a c -sortable word w , and thus noncrossing partitions, as well as the wide subcategories associated to H_w , are given in terms of non-green vertices.

Comments: 15 pages, 2 figures and 1 table

Subjects: **Combinatorics (math.CO)**; Representation Theory (math.RT)

Cite as: [arXiv:1205.0034](#) [math.CO]

(or [arXiv:1205.0034v1](#) [math.CO] for this version)

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From: Yu Qiu [[view email](#)]

[v1] Mon, 30 Apr 2012 21:30:47 GMT (17kb)

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