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The flag vector contains all the face incidence data of a polytope, and in the poset setting, the chain enumerative data. It is a classical result due to Bayer and Klapper that for face lattices of polytopes, and more generally, Eulerian graded posets, the flag vector can be written as a cd-index, a non-commutative polynomial which removes all the linear redundancies among the flag vector entries. This result holds for regular CW complexes.

We relax the regularity condition to show the cd-index exists for non-regular CW complexes and extend the notion of a graded poset to that of a quasi-graded poset. (Received September 15, 2011)