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Affine Weyl groups, affine Hecke algebras and affine Deligne-Lusztig varieties

Using some nice combinatorial properties on affine Weyl groups, we establish a relation between representations of affine Hecke algebras and structure of affine Deligne-Lusztig varieties. More precisely, we have the "degree=dimension" theorem, which relates the degree of class polynomials of affine Hecke algebras and the dimension of affine Deligne-Lusztig varieties. As a consequence, we verify the Gortz-Haines-Kottwitz-Reuman conjecture on dimension of affine Deligne-Lusztig varieties.