

WEIGHT THEORY BEYOND FINITE GROUPS

RADHA KESSAR

ABSTRACT. Let G be a finite group and k an algebraically closed field of characteristic p . A weight of kG is a pair (Q, M) where Q is a p -subgroup of G and M is a $k(N_G(Q)/Q)$ -module which is both simple and projective. Alperin's weight conjecture asserts that the following equation, and its block wise refinement, holds:

The number of isomorphism classes of weights of kG = The number of isomorphism classes of simple kG modules.

The number of weights of a block can be expressed in terms of the fusion system of the block, hence the left hand side of the (block wise) equation makes sense even for fusion systems which do not arise from finite groups or their blocks.

The focus of my talk is the question: Is there a candidate for the right hand side? We are far from answers, but I will describe some preliminary attempts in this direction.