The algebraic theory of tempered representations

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Traditionally the notion of a tempered representation of a p-adic reductive group G includes the admissibility requirement. This makes it impossible to apply algebraic methods. In this lecture we will treat the convolution algebra S(G) of Schwartz functions on the group G as an abstract algebra, and we will look at the category of all nondegenerate S(G)-modules. This contains as a subcategory the classical tempered representations. We will discuss the formalism of parabolic induction and restriction in this new context. The goal of this joint work in progress with W. Zink is to imitate Bernstein's theory of projective generators thereby obtaining an algebraic approach to the Plancherel isomorphism.