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Representations of GL(n,R) and Sp(2n,R) where R is a p-adic field or a finite local ring

Suppose that G is a reductive group defined over $\mathbb{Z}$, such as the general linear group GL_n or the symplectic group Sp_{2n}. Consider the representation space V of a smooth irreducible complex representation of $G(F)$ where F is a p-adic field. Restrict to $G(R)$ where R is the ring of integers of F. This gives rise to a series for V whose factors are sums of irreducible representations V_i of the finite groups $G(S_i)$ where S_i is R mod the i-th power of the maximal ideal of R. We discuss the interconnections between these representations V_i and the original representation V.