On the p-adic holomorphic discrete series

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Abstract

Let $[K\colon \mathbf{Q}_p] < \infty$. Generalizing a construction of Morita from the case $d = 1$ to arbitrary $d \in \mathbf{N}$, Schneider associated to each K-rational representation V of $\mathrm{GL}_d(K)$ a certain $\mathrm{SL}_{d+1}(K)$-equivariant vector bundle $\mathcal{D}(V)$ on Drinfel'd's symmetric space X over K of dimension d. The space $D(V)$ of its global sections he called a holomorphic discrete series representation of $\mathrm{SL}_{d+1}(K)$. I want to discuss $\mathrm{SL}_{d+1}(K)$-equivariant integral structures inside $\mathcal{D}(V)$; under a suitable dominance condition these lead to non trivial $\mathrm{SL}_{d+1}(K)$-stable $\mathcal{O}_K$-modules (not containing lines) inside $D(V)$ whose reduction can be effectively computed. Moreover I want to explain that for (arithmetic) cocompact discrete torsionfree subgroups $\Gamma \subset \mathrm{SL}_{d+1}(K)$ the cohomology spaces $H^*(\Gamma, D(V))$ appear as the graded pieces (for the Hodge filtration) of certain weakly admissible filtered (ϕ, N)-modules related to the universal p-divisible group over $X\widehat{\otimes}_K K^{ur}$.