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NOTES ON REPRESENTATIONS OF NON-ARCHIMEDEAN SL(n)

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Let F be a non-archimedean local field. In this paper the relation between irreducible representations of $\mathrm{GL}(n, F)$ and $\mathrm{SL}(n, F)$ is studied. Using the results on $\mathrm{GL}(n, F)$ a parametrization of (various classes of) irreducible representations of $\mathrm{SL}(n, F)$ by parameters expressed in terms of cuspidal representations of $\mathrm{GL}(n, F)$ is obtained.

Introduction. Before we give a more detailed description of the content of this paper, a few historical remarks on $\mathrm{SL}(n, F)$ are needed. Gelfand and Naimark gave in **[8]** proof of the irreducibility of unitary principal series representations of $\mathrm{SL}(n, \mathbf{C})$. The same proof gives the irreducibility of unitary principal series for $\mathrm{GL}(n)$ over any local field. Using the fact that the unitary principal series have non-trivial Whittaker models for $\mathrm{GL}(n)$, and the uniqueness of the model proved by Rodier (**[18]**), Howe and Silberger proved in **[10]** that the unitary principal series of $\mathrm{GL}(n, F)$ restricted to $\mathrm{SL}(n, F)$ are multiplicity free. The same idea appears in Labesse and Langlands paper **[14]**. In this way, Howe and Silberger obtained that unitary principal series representations of $\mathrm{SL}(n, F)$ are multiplicity free. Shahidi observed in **[20]** that one can prove, using the same idea of Whittaker models, that any irreducible tempered representation of $\mathrm{GL}(n, F)$ restricted to $\mathrm{SL}(n, F)$ is multiplicity free. In this way one obtains that the parabolically induced representation of $\mathrm{SL}(n, F)$ by irreducible tempered representation is multiplicity free. A general approach to the reducibility and the multiplicities was done by Keys. The structure of the commuting algebras of unitary principal series representations for Chevalley groups was described by him in **[11]** and it turned out the multiplicities are not always one. This was also shown earlier by Knapp and Zuckerman in **[12]**. Gelbart and Knapp gave in **[5]** a description of irreducible constituents of the restriction to $\mathrm{SL}(n, F)$ of the unitary principal series representations of $\mathrm{GL}(n, F)$. Their paper **[6]** is based on two working hypotheses, the second of them is the multiplicity one of the restriction to $\mathrm{SL}(n, F)$ of irreducible representations of $\mathrm{GL}(n, F)$. Bernstein showed in **[1]** that any parabolically