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THE KNAPP-STEIN DIMENSION THEOREM FOR p-ADIC GROUPS. CORRECTION

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The last paragraph of [1] should be replaced by the following:

If the set Σ'' of ω-special roots is empty, there are no singularities, hence nothing to prove, so we may assume $\Sigma'' \neq \varnothing$. Let $\mathfrak{a}_1^*$ be the subspace of $\mathfrak{a}^*$ spanned by Σ''. Since $W(\omega)$ stabilizes Σ'', $W(\omega)$ stabilizes $\mathfrak{a}_1^*$ too. As every hyperplane H_α ($\alpha \in \Sigma''$) intersects $\mathfrak{a}_1^*$, it is enough to prove that $\Phi(1, \nu)$ restricted to $\mathfrak{a}_1^*$ is holomorphic.

Let $\alpha \in \Sigma''$ and $\nu_0 \in (H_\alpha \cap \mathfrak{a}_1^*) - \bigcup_{\alpha' \neq \alpha} H_{\alpha'}$. We shall show that $\Phi(1, \nu)$ is holomorphic at $\nu = \nu_0$, $\nu \in \mathfrak{a}_1^*$. To see this, note first that $W(\omega_{\nu_0}) \cap W''(\omega) = \{1, s_\alpha\}$, which follows from well-known properties of Weyl groups. We may choose representatives $s_1, \ldots, s_r \in \{1, s_\alpha\} \setminus W(\omega)$ such that s_i and $s_\alpha s_i$ fix $H_\alpha \cap \mathfrak{a}_1^*$ for all $i = 1, \ldots, r$. Since an orthogonal linear transformation which fixes a hyperplane is either a reflection or the identity, we may assume that s_i acts as the identity on $\mathfrak{a}_1^*$ for every i. Choosing a set of representatives for $W''(\omega)/\{1, s_\alpha\}$, we may write

$$\Phi(1, \nu) = \sum_{t \in W''(\omega)/\{1, s_\alpha\}} \left(c_{P|P}(t : \omega : \nu)\psi\chi_{t\nu} + c_{P|P}(ts_\alpha : \omega : \nu)\psi\chi_{ts_\alpha\nu}\right).$$

It is enough to show that

$$c_{P|P}(t : \omega : \nu)\psi\chi_{t\nu} + c_{P|P}(ts_\alpha : \omega : \nu)\psi\chi_{ts_\alpha\nu}$$

is holomorphic at $\nu = \nu_0$ for each representative $t \in W''(\omega)/\{1, s_\alpha\}$ in order to conclude that $\Phi(1, \nu)$ is holomorphic at $\nu = \nu_0$, hence that the singularity set of $\Phi(1, \nu)$ contains no piece of H_α near $\nu = 0$.

To check that

$$c_{P|P}(t : \omega : \nu)\psi\chi_{t\nu} + c_{P|P}(ts_\alpha : \omega : \nu)\psi\chi_{ts_\alpha\nu}$$

is holomorphic at $\nu = \nu_0$, note that there is a neighborhood V of ν_0 on which

$$E_{P,(\omega_{\nu_0})'}(P : \psi : \nu) = \sum_{i=1}^{r} \left(c_{P|P}(ts_i : \omega : \nu)\psi\chi_{ts_i\nu} + c_{P|P}(ts_\alpha s_i : \omega : \nu)\psi\chi_{ts_\alpha s_i\nu}\right)$$

is holomorphic. For all $\nu \in V \cap \mathfrak{a}_1^*$ and $i = 1, \ldots, r$,

$$\begin{aligned} c_{P|P}(ts_i : \omega : \nu)\psi\chi_{ts_i\nu} &+ c_{P|P}(ts_\alpha s_i : \omega : \nu)\psi\chi_{ts_\alpha s_i\nu} \\ &= c_{P|P}(t : \omega : \nu)\psi\chi_{t\nu} + c_{P|P}(ts_\alpha : \omega : \nu)\psi\chi_{ts_\alpha\nu}. \end{aligned}$$

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It follows that $c_{P|P}(t : \omega : \nu)\psi\chi_{t\nu} + c_{P|P}(ts_\alpha : \omega : \nu)\psi\chi_{ts_\alpha\nu}$ is holomorphic on $V \cap \mathfrak{a}_1^*$ for each t. Thus, $\Phi(1, \nu)$ is holomorphic at $\nu = \nu_0$ on $\mathfrak{a}_1^*$; this implies that the singularity set of $\Phi(1, \nu)$ contains no piece of the hyperplane H_α near $\nu = 0$ in $\mathfrak{a}^*$. Since $\alpha \in \Sigma''$ is arbitrary, the singularity set of $\Phi(1, \nu)$ contains no piece of hypersurface near $\nu = 0$, so $\Phi(1, \nu)$ is holomorphic at $\nu = 0$. This proves the theorem.

References

1. A. J. Silberger, *The Knapp-Stein dimension theorem for p-adic groups*, Proc. Amer. Math. Soc. **68** (1978), 243–246.

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