Errata

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From category $\mathcal{O}^\infty$ to locally analytic representations (doi: 10.1016/j.jalgebra.2021.09.032, arXiv: 2011.12370v5)

We would like to extend our thanks for Zichuan Wang for a careful read-through of the paper.

- Section 2.4, line 3: $\mathfrak{g} = \bigoplus_{\alpha \in \mathfrak{t}^*} \mathfrak{g}_\alpha$ (no subscript E is needed).
- Lemma 2.4.2: $\mathfrak{p}$ should be $\mathfrak{g}$.
- Equation 2.4.3: Right-hand side should be $\phi_n(y)(x \,.\, m)$, and in the following line, $\mathfrak{p}_{\alpha,E}$ should be $\mathfrak{g}_\alpha$.
- Paragraph 2.4.6: $\mathfrak{p}$ should be $\mathfrak{g}$.
- Paragraph 2.5.3: The sixth sentence should end with $\sigma|_{T'} = \rho|_{T'}$ (one of the restriction bars was missing).
- Equation 2.5.4: Should be $\sigma(tht^{-1}) = \rho(t) \circ \sigma(h) \circ \rho(t^{-1})$.
- Proof of equation 2.5.4: Replace the last four sentences with the following:

  Next, suppose h is in a root subgroup U_α of P'. As we noted at the end of paragraph 2.5.2, the action of h on M is then given by
  $$\sigma(h) = \exp(\phi(\log(h))).$$
  Let $x = \log(h) \in \mathfrak{p}_\alpha$. Then $tht^{-1} = \exp(\chi_\alpha(t)x)$, so
  $$\sigma(tht^{-1}) = \exp(\phi(\chi_\alpha(t)x)) = \exp(\chi_\alpha(t)\phi(x))$$
  On the other hand, we have
  $$\rho(t) \circ \sigma(h) \circ \rho(t)^{-1} = \rho(t) \circ \exp(\phi(x)) \circ \rho(t^{-1}) = \exp(\rho(t) \circ \phi(x) \circ \rho(t^{-1})).$$
  To show that these two endomorphisms of M coincide, it is sufficient to show that they coincide for any generalized weight vector $m \in M_\lambda$. Then $\rho(t^{-1})(m) \in M_\lambda$, so $(\phi(x) \circ \rho(t^{-1}))(m) \in M_{\alpha+\lambda}$ by lemma 2.4.1. Letting $y = \log(t)$, we see that
  $$\begin{aligned}(\rho(t) \circ \phi(x) \circ \rho(t^{-1}))(m) &= (\chi_{\alpha+\lambda}(t) \exp(\phi_n(y)) \circ \phi(x) \circ \exp(-\phi_n(y))\chi_\lambda(t)^{-1})(m) \\ &= (\chi_\alpha(t)\phi(x))(m),\end{aligned}$$
  where we use lemma 2.4.2 to conclude that $\exp(\phi_n(y))$ and $\phi(x)$ commute. Thus
  $$(\rho(t) \circ \sigma(h) \circ \rho(t)^{-1})(m) = \exp(\chi_\alpha(t)\phi(x))(m) = \sigma(tht^{-1})(m),$$
  which proves the desired equation.