CHEN-BO ZHU'S RESEARCH IN PICTURES
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Key words:
- Classical groups, invariant distributions, local theta correspondence.
- Unitary representations, models of representations.

FIGURE 1. Invariant distributions of classical groups
[Reference: Duke Math. J. 65 (1992)]

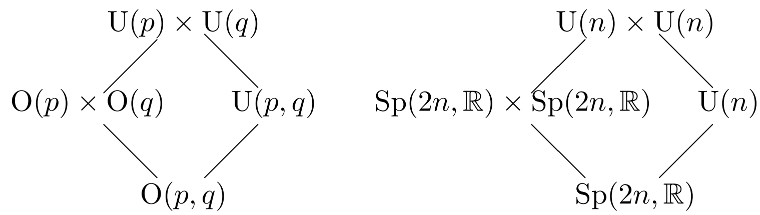

FIGURE 2. On certain small representations of indefinite orthogonal groups
[Reference: Represent. Theory 1 (1997); with J.-S. Huang]

$$O(p,q) \curvearrowright \mathcal{N}\mathrm{ull}^{\mathrm{reg}} \quad (\subset M_{p+q,n}(\mathbb{R})) \rightsquigarrow \pi_n$$

$$\boxed{\pi_n \quad \text{quantizes certain small nilpotent orbit} \quad \mathcal{O}_n, \quad \text{for} \quad n \leq \frac{1}{2}\min(p,q).}$$

FIGURE 3. Degenerate principal series and local theta correspondence
[Reference: Trans. Amer. Math. Soc. 350 (1998); with S. T. Lee]

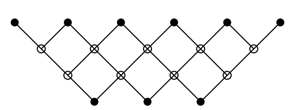

FIGURE 4. Transfer of unitary representations (between real forms)
[Reference: Asian J. Math. 8 (2004); with N. Wallach]

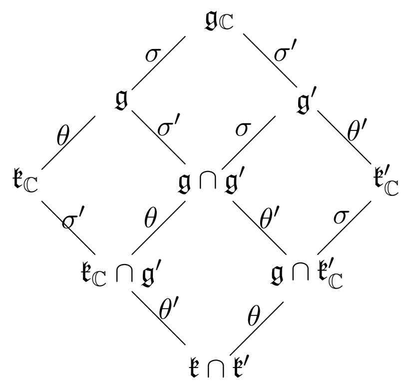

FIGURE 5. Theta lifting and associated cycles
[Reference: Duke Math. J. 125 (2004); with K. Nishiyama]

$$\begin{array}{ccccc} V & \xleftarrow{//K'_{\mathbb{C}}} & \Xi \times_Y Z & \xrightarrow{//K_{\mathbb{C}}} & Z \\ \big\downarrow{\scriptstyle //H} & & \big\downarrow{\scriptstyle //H} & & \big\downarrow{\scriptstyle //H} \\ X & \xleftarrow{//K'_{\mathbb{C}}} & \Xi & \xrightarrow{//K_{\mathbb{C}}} & Y \end{array}$$

FIGURE 6. Uniqueness of Bessel models
[Reference: GAFA 20 (2010); with D. Jiang and B. Sun]

$$\forall \pi \in \mathrm{Irr}(G) \quad \text{and} \quad \pi_0 \in \mathrm{Irr}(G_0) :$$

$$\boxed{\dim \mathrm{Hom}_{S_r}(\pi \widehat{\otimes} \pi_0, \chi_{S_r}) \leq 1,}$$

where $S_r = G_0 \ltimes N_{S_r}$ is the r-th Bessel subgroup of G.

FIGURE 7. Multiplicity one theorems (for classical spherical pairs)
[Reference: Annals of Math. 175 (2012); with B. Sun]

$$\forall \pi \in \operatorname{Irr}(G) \quad \text{and} \quad \pi' \in \operatorname{Irr}(G') :$$

$$\boxed{\dim \operatorname{Hom}_{G'}(\pi, \pi') \leq 1.}$$

FIGURE 8. Theta lifting of generalized Whittaker models
[Reference: GAFA 24 (2014); with R. Gomez]

$$\begin{array}{ccc} & \operatorname{Hom}(V, \tilde{V}) & \\ {}^{\varphi}\swarrow & & \searrow^{\tilde{\varphi}} \\ \mathcal{O} \subset \mathfrak{g} & & \tilde{\mathfrak{g}} \supset \tilde{\mathcal{O}} \end{array}$$

$$\boxed{\operatorname{Wh}_{\tilde{\mathcal{O}}}(\Theta(\pi)) \cong \operatorname{Wh}_{\mathcal{O}}(\check{\pi}), \quad \forall \pi \in \operatorname{Irr}(\mathrm{G}).}$$

FIGURE 9. Conservation relations for local theta correspondence
[Reference: Jour. Amer. Math. Soc. 28 (2015); with B. Sun]

$$\forall \pi \in \operatorname{Irr}(\bar{\mathrm{G}}(U)) :$$

$$\boxed{\mathrm{n}_{\mathbf{t}_1}(\pi) + \mathrm{n}_{\mathbf{t}_2}(\pi) = 2 \dim U + \mathrm{d}_{\mathrm{D},\epsilon},}$$

where $\mathrm{d}_{\mathrm{D},\epsilon} = 0, 1, 2, 3, 4,$ depending on D and ϵ.