PROBLEM SET 2

$G = \mathsf{PGL}_2$.

Problem 1. *Verify Drinfeld–Gaitsgory 2nd adjointness when evaluated on the constant sheaf* k_{Bun_G} *on* Bun_G.

Problem 2. *Let* B^- *be the standard opposite Borel subgroup and define* CT^-_*, $\mathsf{CT}^-_!$ *as in the lecture but replacing* B *with* B^-. *Show that Drinfeld–Gaitsgory 2nd adjointness can be rewritten as*

$$\mathsf{CT}^-_! \simeq \mathsf{CT}_*.$$

Now try to make a guess for the natural transformation $\mathsf{CT}_* \to \mathsf{CT}^-_!$. *Challenge: make a guess for the other direction* $\mathsf{CT}^-_! \to \mathsf{CT}_*$.

Problem 3. *Challenge: for* $g \geq 1$, *show that cuspidal sheaf exists.*

Problem 4. *Find a nonzero* $\mathcal{F}$ *such that* $\mathsf{coeff}_0(\mathcal{F}) \simeq 0$.