

1. Go over "Foundations I" handout.

Claim Mod The β -relations,

$$\begin{array}{c} x \quad y \\ \swarrow \quad \searrow \\ \downarrow \end{array} = \begin{array}{c} x \quad y \quad x \\ \swarrow \quad \searrow \quad \downarrow \\ \downarrow \end{array} - \begin{array}{c} x \quad y \\ \swarrow \quad \searrow \\ \downarrow \end{array} \circ^x y$$

$$[x, y] = C_x y - C_y x$$

$$e^{\alpha x} e^{\beta y} =$$

$$\exp \left[\frac{\alpha C_x + \beta C_y}{e^{\alpha C_x + \beta C_y - 1}} \left(\frac{e^{\alpha C_x - 1}}{\alpha C_x} \alpha x + e^{\alpha C_x} \frac{e^{\beta C_y - 1}}{\beta C_y} \beta y \right) \right]$$

$$= \exp \left(\frac{1}{j(\alpha C_x + \beta C_y)} \left(j(\alpha C_x) \alpha x + e^{\alpha C_x} j(\beta C_y) \beta y \right) \right)$$

$$\begin{array}{c} x^* \quad y^* \\ \swarrow \quad \searrow \\ \downarrow \end{array} \exp = \exp \left[\begin{array}{c} F \quad x^* \\ \downarrow \quad \downarrow \quad \downarrow \end{array} + \begin{array}{c} G \quad x^* \quad y^* \quad x^* \quad y^* \\ \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \end{array} \right]$$

Claim Modulo the β relations,

$$\begin{array}{c} \alpha x \\ \swarrow \quad \searrow \\ \downarrow \end{array} = \begin{array}{c} \alpha x \\ \swarrow \quad \searrow \\ \downarrow \end{array} \circ^{\alpha C_1}$$

Claim

$$\begin{array}{c} x \quad y \\ \swarrow \quad \searrow \\ \downarrow \end{array} \beta = \begin{array}{c} x \quad y \\ \swarrow \quad \searrow \\ \downarrow \end{array} \begin{array}{c} e^{\alpha C_2 - 1} \beta C_1 \\ C_2 \end{array}$$