$$
\begin{array}{rlcl}
\mathsf{BinOp} & \oplus & ::= & \texttt{Product} \mid \texttt{Sum} \mid \texttt{Arrow} \\
\mathsf{Kind} & \kappa & ::= & \texttt{Ty} \mid \texttt{KHole} \\
\mathsf{ConstantTypes} & c & ::= & \texttt{Int} \mid \texttt{Float} \mid \texttt{Bool} \\
\mathsf{UserHTyp} & \hat{\tau} & ::= & c \mid \hat{\tau}_1 \oplus \hat{\tau}_2 \mid \texttt{list}(\hat{\tau}) \mid (\!|\,|\!)^u \mid (\!|\hat{\tau}|\!)^u \\
\mathsf{InternalHTyp} & \tau & ::= & c \mid \tau_1 \oplus \tau_2 \mid \texttt{list}(\tau) \mid (\!|\,|\!)^u \mid (\!|\tau|\!)^u
\end{array}
$$

$\boxed{\kappa_1 \sim \kappa_2}$ κ_1 is consistent with κ_2

$$\texttt{KCHole}\ \frac{}{\texttt{KHole} \sim \texttt{Ty}} \qquad \texttt{KCSymm}\ \frac{\kappa_1 \sim \kappa_2}{\kappa_2 \sim \kappa_1} \qquad \texttt{KCRefl}\ \frac{}{\kappa \sim \kappa}$$

$\boxed{\Phi \vdash \hat{\tau} \Rightarrow \kappa \rightsquigarrow \tau \dashv \Delta}$ $\hat{\tau}$ synthesizes kind κ and elaborates to τ

$$\texttt{TElabSConst}\ \frac{}{\Phi \vdash c \Rightarrow \texttt{Ty} \rightsquigarrow c \dashv \cdot}$$

$$\texttt{TElabSBinOp}\ \frac{\Phi \vdash \hat{\tau}_1 \Leftarrow \texttt{Ty} \rightsquigarrow \tau_1 : \texttt{Ty} \dashv \Delta_1 \qquad \Phi \vdash \hat{\tau}_2 \Leftarrow \texttt{Ty} \rightsquigarrow \tau_2 : \texttt{Ty} \dashv \Delta_2}{\Phi \vdash \hat{\tau}_1 \oplus \hat{\tau}_2 \Rightarrow \texttt{Ty} \rightsquigarrow \tau_1 \oplus \tau_2 \dashv \Delta_1 \cup \Delta_2}$$

$$\texttt{TElabSList}\ \frac{\Phi \vdash \hat{\tau} \Leftarrow \texttt{Ty} \rightsquigarrow \tau : \texttt{Ty} \dashv \Delta}{\texttt{list}(\hat{\tau}) \vdash \texttt{Ty} \Rightarrow \texttt{list}(\tau) \rightsquigarrow \Delta \dashv} \qquad \texttt{TElabSVar}\ \frac{t : \kappa \in \Phi}{\Phi \vdash t \Rightarrow \kappa \rightsquigarrow t \dashv \cdot}$$

$$\texttt{TElabSUVar}\ \frac{t \notin \Phi}{\Phi \vdash t \Rightarrow \texttt{KHole} \rightsquigarrow (\!|t|\!)^u_{\mathsf{id}(\Phi)} \dashv u :: (\!|\,|\!)[\Phi]}$$

$$\texttt{TElabSHole}\ \frac{}{\Phi \vdash (\!|\,|\!)^u \Rightarrow \texttt{KHole} \rightsquigarrow (\!|\,|\!)^u_{\mathsf{id}(\Phi)} \dashv u :: (\!|\,|\!)[\Phi]}$$

$$\texttt{TElabSNEHole}\ \frac{\Phi \vdash \hat{\tau} \Rightarrow \kappa \rightsquigarrow \tau \dashv \Delta}{\Phi \vdash (\!|\hat{\tau}|\!)^u \Rightarrow \texttt{KHole} \rightsquigarrow (\!|\tau|\!)^u_{\mathsf{id}(\Phi)} \dashv \Delta, u :: (\!|\,|\!)[\Phi]}$$

$\boxed{\Phi \vdash \hat{\tau} \Leftarrow \kappa_1 \rightsquigarrow \tau : \kappa_2 \dashv \Delta}$ $\hat{\tau}$ analyzes against type κ_1 and elaborates to τ of consistent type κ_2

$$\frac{\hat{\tau} \neq (\!|\!|\!)^u \qquad \hat{\tau} \neq (\!|\hat{\tau}'|\!)^u \qquad \Phi \vdash \hat{\tau} \Rightarrow \kappa' \rightsquigarrow \tau \dashv \Delta \qquad \kappa \sim \kappa'}{\Phi \vdash \hat{\tau} \Leftarrow \kappa \rightsquigarrow \tau : \kappa' \dashv \Delta}\ \texttt{TElabASubsume}$$

$$\frac{}{\Phi \vdash (\!|\!|\!)^u \Leftarrow \kappa \rightsquigarrow (\!|\!|\!)^u_{\mathsf{id}(\Phi)} : \kappa \dashv u :: \kappa[\Phi]}\ \texttt{TElabAEHole}$$

$$\frac{\Phi \vdash \hat{\tau} \Rightarrow \kappa' \rightsquigarrow \tau \dashv \Delta}{\Phi \vdash (\!|\hat{\tau}|\!)^u \Leftarrow \kappa \rightsquigarrow (\!|\tau|\!)^u_{\mathsf{id}(\Phi)} : \kappa \dashv \Delta, u :: \kappa[\Phi]}\ \texttt{TElabANEHole}$$