

$$\begin{array}{c}
\frac{}{\text{hyp}} \quad \frac{}{\text{hyp}} \quad \frac{G \wedge F, \quad F, \vdash F \wedge G}{G, E} \\
\frac{}{\text{hyp}} \quad \frac{G \wedge F, \quad F, G \vdash F \quad G \wedge F, \quad F, G \vdash G}{\wedge \text{ intro}} \quad \frac{}{\rightarrow \text{ intro}} \\
\frac{G \wedge F, \quad G \vdash G \wedge F}{\wedge \text{ elim}} \quad \frac{G \wedge F, \quad F, G \vdash F \wedge G \quad G \wedge F, \quad F, G \vdash E \rightarrow F \wedge G}{\wedge \text{ intro}} \\
\frac{}{\text{hyp}} \quad \frac{G \wedge F, \quad G \vdash F \quad G \wedge F, \quad F, G \vdash (F \wedge G) \wedge (E \rightarrow F \wedge G)}{\text{cut}} \\
\frac{G \wedge F \vdash G \wedge F}{\wedge \text{ elim}} \quad \frac{G \wedge F, \quad G \vdash (F \wedge G) \wedge (E \rightarrow F \wedge G)}{\text{cut}} \\
G \wedge F \vdash (F \wedge G) \wedge (E \rightarrow F \wedge G)
\end{array}$$