

Natural Deduction

All the rules

$$\wedge\text{-intro} \quad \frac{\begin{array}{|l} \phi \\ \psi \end{array}}{\phi \wedge \psi}$$

$$\wedge\text{-elim-l} \quad \frac{\phi \wedge \psi}{\phi}$$

$$\wedge\text{-elim-r} \quad \frac{\phi \wedge \psi}{\psi}$$

$$\vee\text{-intro-r} \quad \frac{\phi}{\phi \vee \psi}$$

$$\vee\text{-intro-l} \quad \frac{\phi}{\psi \vee \phi}$$

$$\vee\text{-elim} \quad \frac{\begin{array}{|l} \phi \\ \chi \\ \psi \\ \chi \\ \phi \vee \psi \end{array}}{\chi}$$

$$\rightarrow\text{-elim} \quad \frac{\begin{array}{|l} \phi \\ \phi \rightarrow \psi \end{array}}{\psi}$$

$$\rightarrow\text{-intro} \quad \frac{\begin{array}{|l} \phi \\ \psi \end{array}}{\phi \rightarrow \psi}$$

$$\leftrightarrow\text{-elim-l} \quad \frac{\begin{array}{|l} \phi \leftrightarrow \psi \\ \psi \end{array}}{\phi}$$

$$\leftrightarrow\text{-elim-r} \quad \frac{\begin{array}{|l} \phi \leftrightarrow \psi \\ \phi \end{array}}{\psi}$$

$$\leftrightarrow\text{-intro} \quad \frac{\begin{array}{|l} \phi \\ \psi \\ \psi \\ \phi \end{array}}{\phi \leftrightarrow \psi}$$

$$\neg\text{-elim} \quad \frac{\begin{array}{|l} \neg\neg\phi \\ \phi \end{array}}$$

$$\neg\text{-intro} \quad \frac{\begin{array}{|l} \phi \\ \psi \\ \phi \\ \neg\psi \end{array}}{\neg\phi}$$

$$\text{rep} \quad \frac{\phi}{\phi}$$

$$\forall\text{-elim} \quad \frac{\forall x\phi}{\phi[x/t]}$$

$$\forall\text{-intro} \quad \frac{\phi}{\forall x\phi[a/x]} \quad (a \text{ not in premise or undischarged assumption})$$

$$\exists\text{-intro} \quad \frac{\phi[x/t]}{\exists x\phi}$$

$$\exists\text{-elim} \quad \frac{\begin{array}{|l} \exists x\phi[a/x] \\ \phi \\ \psi \end{array}}{\psi} \quad (a \text{ not in premise, undischarged assumption, or } \psi)$$