Inference rules in natural deduction.

Name	*rule*	coq forward	coq backward
$\wedge I$	$\dfrac{\begin{array}{c}H1 : A \\ H2 : B\end{array}}{A \wedge B}$	`pose proof(conj H1 H2).`	`split.`
$\wedge E_1$	$\dfrac{H1 : A \wedge B}{A}$	`pose proof(proj1 H1).`	–
$\wedge E_2$	$\dfrac{H1 : A \wedge B}{B}$	`pose proof(proj2 H1).`	–
$\vee I_1$	$\dfrac{H1 : C}{C \vee X}$	`pose proof(or_introl (B:=X) H1).` or `pose proof(@or_introl _ X H1).`	`left.`
$\vee I_2$	$\dfrac{H1 : C}{X \vee C}$	`pose proof(or_intror (A:=X) H1).` or `pose proof(@or_intror X _ H1).`	`right.`
$\vee E$	$\dfrac{\begin{array}{c}H1 : A \vee B \\ H2 : A \Rightarrow C \\ H3 : B \Rightarrow C\end{array}}{C}$	`destruct H1.` ($H2$ and $H3$ are not needed)	–
$\Rightarrow I$	assumption/discharge	`assert(A->B). intros Hn.`	`intros Hn.`
$\Rightarrow E$	$\dfrac{\begin{array}{c}H1 : A \Rightarrow B \\ H2 : A\end{array}}{B}$	`pose proof(H1 H2).`	`apply H1.`
$\neg I$	$\dfrac{H1 : A \Rightarrow \bot}{\neg A}$	`pose proof (H1:~A).`	–
$\neg E$	$\dfrac{H1 : \neg A}{A \Rightarrow \bot}$	`unfold not in *.`	`unfold not.`
$\Leftrightarrow I$	$\dfrac{\begin{array}{c}H1 : A \Rightarrow B \\ H2 : B \Rightarrow A\end{array}}{A \Leftrightarrow B}$	`pose proof(conj H1 H2:A<->B).`	`split.`
$\Leftrightarrow E$	$\dfrac{\begin{array}{c}H1 : A \Leftrightarrow B \\ H2 : (\ldots A \ldots)\end{array}}{(\ldots B \ldots)}$	`rewrite H1 in H2.` or `rewrite <- H1 in H2.`	`rewrite H1.` or `rewrite <- H1.`
$\bot E$	$\dfrac{H1 : \bot}{X}$	`destruct H1.`	`exfalso.`
$\top I$	$\dfrac{}{\top}$	`pose proof(I).`	–
$\forall I$	assumption/discharge	–	`intros c`
$\forall E$	$\dfrac{\begin{array}{c}H1 : \forall x, Px \\ c \text{ is a constant}\end{array}}{Pc}$	`pose proof(H1 c).`	–
$\exists I$	$\dfrac{\begin{array}{c}c \text{ is a constant} \\ H1 : Pc\end{array}}{\exists x, Px}$	`pose proof(ex_intro P c H1).`	`exists c.`
$\exists E$	$\dfrac{H1 : \exists x, Px}{\begin{array}{c}c \text{ is a constant (fresh)} \\ Pc\end{array}}$	`destruct H1.`	–
$=I$	$\dfrac{c \text{ is a constant}}{c = c}$	`pose proof(eq_refl c).`	`reflexivity`
$=E$	$\dfrac{\begin{array}{c}c \text{ is a constant} \\ d \text{ is a constant} \\ H1 : c = d \\ H2 : Pc\end{array}}{Pd}$	`rewrite H1 in H2.` or `rewrite <- H1 in H2.`	`rewrite H1.` or `rewrite <- H1.`