

BITS Pilani Hyderabad Campus
CS F214 Logic in Computer Science,
I Semester 2021-2022
Lecture Notes
Lecture 7

Prove: $q \rightarrow r \vdash p \vee q \rightarrow p \vee r$

1.	$q \rightarrow r$	premise
2.	$p \vee q$	assumption
3.	p	assumption
4.	$p \vee r$	\vee_i 3
5.	q	assumption
6.	r	$\rightarrow e$ 5,1
7.	$p \vee r$	\vee_{i2} 6
8.	$p \vee r$	\vee_e 2,3-4,5-7
9.	$(p \vee q) \rightarrow (p \vee r)$	$\rightarrow i$ 2-8

5.3 “Copy” Rule

$\perp p \rightarrow (q \rightarrow p)$		
1.	p	assumption
2.	q	assumption
3.	p	copy 1
4.	$q \rightarrow p$	$\rightarrow i$ 2-3
5.	$p \rightarrow (q \rightarrow p)$	$\rightarrow i$ 1-4

6 Rules for Negation

6.1 Contradiction

- Contradictions are expressions of the form $\phi \wedge \neg\phi$ or $\neg\phi \wedge \phi$ where ϕ is any proposition.

- \perp represents a contradiction.
- Any proposition can be derived from contradiction.

6.2 Bottom Elimination

$$\frac{\perp}{\psi} \perp e$$

6.3 Not Elimination

$$\frac{\phi \quad \neg\phi}{\perp} \neg e$$