COS 4807 Assignment 1

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Abstract

1 Question 4.2

$$(p \to (q \to r)) \leftrightarrow ((p \wedge q) \wedge \neg r) \tag{1}$$

By substituting for double implication operator:

$$(p \to (q \to r)) \to ((p \wedge q) \wedge \neg r), ((p \wedge q) \wedge \neg r) \to (p \to (q \to r)) \tag{2}$$

Substituting for the implication operator in the first term gives:

$$\neg(p \to (q \to r)), ((p \wedge q) \wedge \neg r) \to (p \to (q \to r)) \tag{3}$$

and

$$((p\wedge)q \wedge \neg r), ((p \wedge q) \wedge \neg r) \to (p \to (q \to r)) \tag{4}$$

Equation 3 becomes

$$p, \neg(q \to r)), ((p \wedge q) \wedge \neg r) \to (p \to (q \to r)) \tag{5}$$

then

$$p, q, \neg r, ((p \wedge q) \wedge \neg r) \to (p \to (q \to r)) \tag{6}$$

Substituting for the implication in the above equation gives:

$$p, q, \neg r, \neg((p \wedge q) \wedge \neg r) \tag{7}$$

and

$$p, q, \neg r, (p \to (q \to r)) \tag{8}$$

Equation 7 becomes

$$p, q, \neg r, \neg(p \wedge q) \tag{9}$$

and

$$p, q, \neg r, r \tag{10}$$