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TOPIC:7-Consistency of premised and Indirect method of proof

Consistency and Inconsistency of premises A set of formulae H, H2, ... Hm is said to be in consistent if their conjunction implies contradiction. u) $H_1 \wedge H_2 \wedge \cdots \wedge H_m \iff F$ set of formulae H, H, Hm is A said to be consistent if it is not inconsistent. 1) Prove that P->Q, Q->R, S->-R, PAS are inconsistent.



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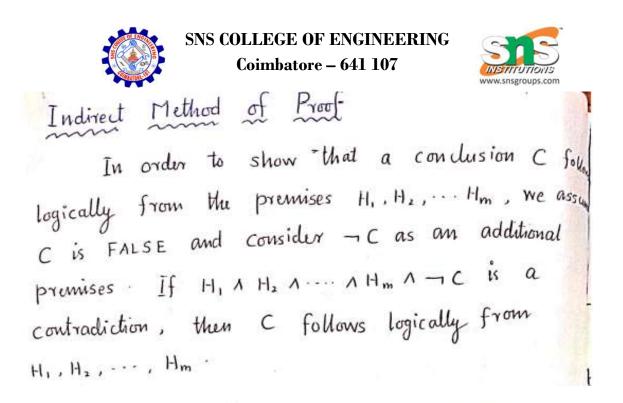


113	1)	P→a	Rule P
{z}	2)	$a \rightarrow R$	Rule P
<i>ξ</i> 1,2 <i>ζ</i>	3)	$P \rightarrow R$	Rule T $(P \rightarrow a, a \rightarrow R$ $\Rightarrow P \rightarrow R)$
<u></u> {4}	4)	$S \rightarrow \neg R$	Rule P
{ 4}	5)	$R \rightarrow \neg s$	$Rule T(P \rightarrow Q \Leftrightarrow \neg Q \rightarrow \neg P)$
\$1,2,4}	6)	$P \rightarrow \neg S$	$ \operatorname{Rule} T (P \rightarrow a, a \rightarrow R \Rightarrow P \rightarrow R)$
£1,2,4}	٦)		Rule T (P→a ⇔ ¬PVQ)
\$1,2,4}	8)	- (P^s)	Rule T (Demorgan's)
<u></u> {9}	9)	PAS	Rule P
£1,2,4,9}	10)	(P∧S) ∧ ¬(P₩S)	Rule T (P, q ⇒ PAQ)

but false value. There fore wer nothing 8 which 15 inconsistent ane . promises

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(C) Prove that
$$P \rightarrow Q$$
, $Q \rightarrow R$, $R \rightarrow S$, $S \rightarrow \neg R$
and $P \wedge S$ are inconsistant.

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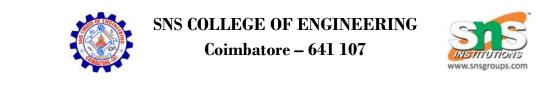


1. Using indirect method of proof, durive p > - S from the premises P -> (qvr), q -> -P, S -> -r and P.

we consider ¬ (p→¬s) as an additional premises. = ¬ (¬pv¬s) = p∧s.

113	1) prs	Assumed premises
§23	2) $p \rightarrow (qvr)$	Rule P
53}	3) P	Rule P
{z.3}	4) 9V7	Rule T (P, P→a ⇒ a)
{ 1 }	5) S	Rule T (PAQ ⇒ Q)
{6 }	6) S→¬Y	Rule P
\$1,63	ר (ר	Rule T (P, P→a ⇒ a).
{1,0}	1	

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{2,3}	8) $\neg 9 \rightarrow \gamma$	Rule T (P->a =>Pvo
§2,3}	9) ¬r →9	Rule T (contrapositive)
\$1,2.3,6}	10) q	Rule T (P, P→a ⇒a)
{II}	11) 9→¬P	Rule P
\$1,2,3,6,11}	12) ¬Þ.	Rule T (P, P→a⇒a)
\$1,2,3,6,11}	13) pr-p	Rule T (P, Q ⇒ PAQ)

which is nothing but false value. . By method of contradiction, $p \rightarrow \neg S$



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2) Show that the following argument is valid. "Thy father praises meanly if I can be proved of myself. Either I do well in sports or I cannot be proved of kindself. If study hard, then I cannot do well in sports. Therefore, if father provises me, then I do not study well". Let A: My father praises me B: I can be proved of myself c: I do well in sports D: I study hard

Thun, the premises are $A \rightarrow B$, $C \vee \neg B$, $D \rightarrow \neg C$ Conclusion is $A \rightarrow \neg D$

