Homal form of a given formula

s consisting of n variables is known,

then the principle disjunctive normal

form of 78 will consist the

disjunction of the remaining minterny

(maxterns) which do not appear in

the principle disjunctive or conjunctive

normal form of 3

From 8 > 7(75): one can obtain the principle conjunctive or disjunctive rormal form of 3

O without constructing the truth table objain the product of sums (PCNF) canonical eform of the formula, $(7P \rightarrow R) \Lambda(R \supseteq P)$ there find the sum of product PDNF canonical form

Set $S \Leftrightarrow (7P \rightarrow R) \land (62P)$ $(P \lor R) \land (62P) \land (P \rightarrow 6)$ $(P \lor R) \land (62P) \land (7P \lor 6)$ ⇒ [PUR VF] N[7Q UP VF]NCTPU Q VF]

= [PVRV(QN7Q)]/[7QVPV(RN7Q)] No [7PVQV(QRN7Q)]

> [(PVRVQ)) \(\text{PVRVTQ}) \(\text{A}(\text{TQVPVR})\)
\(\text{A}(\text{TQVPVQ}) \(\text{A}(\text{TPVQVR})\)\(\text{A}(\text{TPVQVR})\)\(\text{A}(\text{TPVQVR})\)

= [(PVQVR) N(PV7QVR) N(PV7QVR)X (PV7QV7R) N(TPVQVR) NCPVQVZR)

(RUQUR) M(PUTQUR) M(PUTQUTR) M (TPUQUR) M(TPUQUTR)

maxterms ⇒ ×(pvQVR) +(pv7QVR)

(PVQV7R)

LTPUTQUE) *(TPUQUTE)

73 > Remaining maxterms of POR

75 (TPV7QVR) A (TPV7QV7R) A (PVQV7R)

773 (TOPUTQUE)NTGPVTQUTR) MT(PUQUTR)

(PNBATR)U(PNBAR)V(TPATRAR)

2 Without using truthtable find

+he PCNF other find PDNF of

P> (Q1P) [7P-> (7Q17P)]

Solu

7P V (Q1P) 1 [PV1Q17P)]

(7PVQ) 1 (7PVP) 1 [PV7Q) 1 (PV7R)]

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philade a deliberation

PCNF & PDNF

using truth table
using truth table we can
using truth table we can
easily find power and PCNF of given
statement formula

working rule to find PDNF

construct truth table for the given
statement formula

the final column value is true

In the selected row, if the truth value of each individual variable value is true select that variable and truth value is false then select the negation of that variable In such a away collect all possible minterns

Sum of all minterms gives the required PDNF

working rule to find PENF construct truth table for the given statement formula

choose each & every row in which the foral column value is false.

In the selected sum of the mith value of each Prodividual variable value is jake; select that variable a truth value is true then select the regation of that variable.

In such a way collect all possitions

product of all maxterns gues the acquired PCNF.

DOBBUR PONF and PENF (TP-) ~ (QUP)

PDNF => Sum of Froducts

PDNF = (PNQNR)V(PNQNTK)V(TPNTQNK)

PNF => Froduct of Sums

PNF => (TPVOVTK)X(TPVOVK)N(PVTQVTE),

(PVTQVR)N(PVQVK)

@ FADD the PCNF and PDNF of the proposition PA(R+R)

PQRQAR PA(DAR) Hullows Maxterons

T.T.F.F.F.

T F T T T PATRAR

T F F T T FATRATE

FTTT PVIQVIR

PVIQUE TOUR TOUR TOUR OF THE PVIQUE

F F T T F PYQVIR

F F F T F PYQVE

PONE = (PAQAR)V(PATRAR)V(PATRATE)

PONE = (TPVTQVE)A(PVTQVTE)A(PVTQVE)

A(PVQVTE)A(PVQVE)

9, FAND THE FENT OND FONT OF (FAR) V(FAND)

P. Q. R. T.Q. PAR PATIO (FAR) V(FAND)

T. T. F. T. F. T. PAQAR

T. T. F. F. T. T. PATIQAR

T. F. F. F. F. F. PATIQAR

T. F. F. F. F. F. PATIQAR

F. T. F. F. F. F. PATIQAR

F. F. F. F. PATIQAR

F. F. F. PATIQAR

F. F. F. F. PATIQAR

F. F. F. F. PATIQAR

F. F. F.

4, Obtain the PONF & PCNF of (PNQ)V(IPAR)

2) using truth table

19, without using truth table

5, Find the PCNF of (PAQ) V(TPAR)

PDNF = (PAQAR) V(PATQAR) V(PATQATE)

PCNF = (TPVTQVR) A(PVTQVTR) A(PVTQVR)

A(PVQ VTR) A(PVQVR).

Theory of enjourie.

The main aim of logic is to privateles function the rules of infrence or privateles of reasoning. Here we one concerned with the infering of a conclusion from given premises.

validity of the conclusion from the agreed validity of the conclusion from the agreement set of foremises they making use of equalmen tule and implication occule. It theory associated with such things is called informed theory.

Rules of inference:

is Rule P:

any point in the derivation

2) Rule 7:

at any point in a derivation if S is tautologically implied by any one of the preceding formulas.

3, Rule CP:

If 5 can be derived from R and Set of premises, then R > S can be derived from the set of premises alone

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D) a) P, P → Q → Q (modus Phones)
b) 7Q, P → Q → 7P (modus tollens)
c) 7P, PVQ → Q (disjunctive Syllogism)
d

2) $P \rightarrow 0$, $Q \rightarrow R \Rightarrow P \rightarrow R$ (choin rule)

3) P,Q > Pro (simplification rule)

4) PNQ => P, Q (Simplification rule)

5) P,Q > PVQ (Addition rule)

b) PATQ => 7(P+Q) Equivalence rule)

Demonstate that R is a valid inference from the premises $P \rightarrow \alpha$, $Q \rightarrow P \subseteq P$ sol: Triver the premises are $P \rightarrow Q$, $Q \rightarrow P \subseteq P$, onclusion: $P \rightarrow Q$

S.3. 1) P>Q Rule P.

223 2) R→R Rule P

f1,23 3) PZR Rolle T. [P>Q, 0>R=P>R

(33 4) Pi - A Rule P

We (17) who have the

[12,3] 3) R Rule T[P.P->Q=Q)

```
show that 7 p bollows logically
  0
       from the practices, Topina) IT a UP) ETR
              Support 17 6 30
      soli-
    Premises are 7 (P170)
                      7Q UP
             condusion 7P. BILL & D.1 (6
                  1) 7(PATR) Rule P.
     2) /PVQ Rule T \Rightarrow \text{Remorgans la}

813 3) P>Q Rule T \Rightarrow P \Rightarrow Q = 7PVQ

823 6) 7RVR Rule T \Rightarrow P \Rightarrow Q = 7PVQ
  823 B) R→R Rule T > R>Q = 7PVQ
     E423 6). P→R Rule T > choin rule
      {3} 7) 7R ~~ Rule P ~ Q ~ Q → R → P → R
     (1,2,3) 8) 7P Rule T [70, P>Q = 7P]
       Show that RVS follows fogically
   3
        from the premises
EVD, (ECVD) -> 7H, 7H -> (ANTB) &
                 (A178) -> (RVS)
        golution
         Remises are CVD, (CVD) > 7H,
                       7H -> CANTB) , (ANTB) -> (RUS)
               conclusion: RVS
```

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113 DEVD RuleP \$27 2) (CVD) >7H RuleP €1,27 3) 7H Rule T [P,P+Q+Q] \$34 4) 7H -> (A17B) Pule P (21,2,3) 5) (ANTB) Rule T[P,P+Q≥Q]. € 43 6) (A17B) -> (RVS) Rule P {1,2,3,4} 7) RUS Rule [P,P→Q →Q]