

Introduction Sum of Products(SOP)

SUMS OF PRODUCTS FORM(SOP)

A Product term is any group of literals appearing either in complemented or uncomplemented form, that are AND ed together. Two or more product terms are OR ed together, to form a sum of products expression.

Example: $F=AB+ACB+AC+BD$ where AB,ACB,AC and BD are product terms.

PRODUCT OF SUMS FORM (POS)

A sum term is any group of literals appearing either in complemented or uncomplemented form that are OR ed together. Two or more sum terms are AND ed together to form a product of sums expression.

Example: $(A+B)(A+B+C)(C+B)(B)$

where $A+B$; $A+B+C$; $C+B$; and B are sum terms

CANONICAL SUM OF PRODUCTS

A sum of products expression is referred to as canonical sum of products or standard sum of products expression if every product term involves every literal or its complement.

Example: $F = ABC + \bar{A}BC + A\bar{B}C + ABC$

Where $ABC, \bar{A}BC, A\bar{B}C$ and ABC are the product terms involves all the literals A, B and C.

CANONICAL PRODUCT OF SUMS

A product of sums expression is referred to as canonical product of sums or standard product of sums expression if every sum term involves every literal.

Example : $F = (A+B+C+D)(A+B+C+D)(A+B+C+D)(A+B+C+D)$

Where $(A+B+C+D);(A+B+C+D); (A+B+C+D); (A+B+C+D)$ are sum terms involves all the literals A, B, C and D.

Minterm :

A product term which contains each of 'n' variables as factors in either complemented or in complemented form is called a Minterm.

Maxterm :

A sum term which contains each of 'n' variables as factors in either complemented or uncomplemented form is called a Maxterm.

Conversion from SOP to standard or canonical SOP form.

To convert SOP to cononical SOP form the following steps are required.

(1) Examine each term ; if it is a minterm, retain it and continue to the next term.

(2) In each product which is not a minterm, check the variables that do not occur; for each x_i that does not occur, multiply the product by $(x$

For example for a three variable function (x, y, z) if a term contains only x, y , which is not a minterm multiply $x y$ with $(\quad).z z+$

(3) Multiply out all products and eliminate redundant terms.

Introduction to Product of Sum(POS)

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SUM OF PRODUCT(SOP)

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- Example: $F=AB+ACB+AC+BD$ where AB,ACB,AC and BD are product terms.

PRODUCT OF SUMS FORM(POS)

A sum term is any group of literals appearing either in complemented or uncomplemented form that are OR ed together. Two or more sum terms are AND ed together to form a product of sums expression.

- Example: $(A'+B)(A+B+C)(C'+B)(B')$

where

$A'+B$; $A+B+C$; $C'+B$; and B' are sum terms

CANONICAL SUM OF PRODUCTS

A sum of products expression is referred to as canonical sum of products or standard sum of products expression if every product term involves every literal or its complement.

Example: $F = ABC + \bar{A}BC + A\bar{B}C + ABC$

where

$ABC, \bar{A}BC, A\bar{B}C$ and ABC are the product terms involves all the literals A, B and C.

CANONICAL PRODUCT OF SUMS

A product of sums expression is referred to as canonical product of sums or standard product of sums expression if every sum term involves every literal

$$\mathbf{Example : F = (A' + B' + C' + D')(A + B + C + D')}$$
$$\mathbf{(A' + B + C + D)(A + B + C' + D')}$$

where

$(A' + B' + C' + D')$; $(A + B + C + D')$; $(A' + B + C + D)$;

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Cont...

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- For example for a three variable function (x, y, z) if a term contains only x, y , which is not a minterm multiply $x y$ with $(z + \bar{z})$

(3) Multiply out all products and eliminate redundant terms.