

SAS Macro for Generation of Linear Trend Free Constant Block Sum PBIB (TF-CBSPBIB) Designs Based on Circular Association Scheme

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Following SAS macro has been developed to generate a class of **TFCBS-PBIB designs in four plots per block based on Circular Association Scheme as obtained by Verma (2021)**. Here user needs to enter the 's = ' where **number of treatments=2s**. Once the value of s is entered, the programme will generate a TFCBS-PBIB design based on method of Verma (2021). Along with the design, a polynomial coefficient (linear) which will be used to measure the effect of trend component would also be generated. The parameters of the design will also be highlighted. Here, the name of the association scheme based on which the design is developed will also be printed once the programme is executed. After execution of the macro, a word file containing the output would also be generated this can then be saved by the user.

```
/*SAS Macro for Generation of Linear Trend Free Constant Block
Sum PBIB (TF-CBSPBIB) Designs Based on Circular Association
Scheme*/
%let s=5; /*Enter the value of s,where v (number of
treatments)=2s */
ods rtf file= 'output.rtf' startpage=no;
proc iml;
a01=1:&s;
a02=2*&s:&s+1;
a001=shape(a01,&s,1);
a002=shape(a02,&s,1);
a=a001||a002;
*print a;
a1=j(&s-1,2,0);
do i=1 to &s-1;
do j=1 to 2;
a1[i,j]=a[i+1,j];
end;
end;
*print a1;
a2=(a1//a[1,]);
D=a||a2[,2]||a2[,1];
*print D;
tr_coeff=j(1,ncol(D),0);
do i=1 to ncol(D);
```

```

if mod(ncol(D),2)=1 then do;
tr_coeff[1,i]=(-ncol(D)+2*(i-1)+1)/2;
end;
else do;
tr_coeff[1,i]=(-ncol(D)+2*(i-1)+1);
end;
end;
print tr_coeff;
v=2*&s;
b=2*&s;
r=2;
k=4;
Lambda1=2;
Lambda2=1;
Lambda3=0;
print 'Linear Trend Free Constant Block Sum PBIB Designs based
on Circular Association Scheme';
Trend_Free_PBIBD=tr_coeff//D;
print Trend_Free_PBIBD;
print 'Top row represents non normalized orthogonal polynomial
coefficient of degree one';
print 'Parameters of the design are' ;
print v b r k Lambda1 Lambda2 Lambda3;
print 'Association Scheme of the Design: Three-Associate Class
Circular Lattice Association Scheme';
run;
ods rtf close;

quit;

```

SAS Output

tr_coeff			
-3	-1	1	3

Linear Trend Free Constant Block Sum PBIB Designs based on Circular Association Scheme

Trend_Free_PBIBD			
-3	-1	1	3
1	10	9	2
2	9	8	3
3	8	7	4
4	7	6	5
5	6	10	1

Top row represents non normalized orthogonal polynomial coefficient of degree one

Parameters of the design are

v	b	r	k	Lambda1	Lambda2	Lambda3
10	10	2	4	2	1	0

Association Scheme of the Design: Three-Associate Class Circular Lattice Association Scheme

Reference

Verma, S. (2021). *Trend resistant constant block-sum Partially balanced incomplete block designs*. Unpublished M.Sc. thesis. ICAR-IARI, New Delhi