Aliase

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Here is some R code that determines aliasing for a design based on the 12-run Hadamard matrix. You might want to try other subsets of the columns, and/or aliases for 3-factor or higher interactions.

```
H12<-rbind(
  c(1, 1, 0, 1, 1, 1, 0, 0, 0, 1, 0),
  c(0, 1, 1, 0, 1, 1, 1, 0, 0, 0, 1),
  c(1, 0, 1, 1, 0, 1, 1, 1, 0, 0, 0),
  c(0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 0),
  c(0, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0),
  c(0, 0, 0, 1, 0, 1, 1, 0, 1, 1, 1),
  c(1, 0, 0, 0, 1, 0, 1, 1, 0, 1, 1),
  c(1, 1, 0, 0, 0, 1, 0, 1, 1, 0, 1),
  c(1, 1, 1, 0, 0, 0, 1, 0, 1, 1, 0),
  c(0, 1, 1, 1, 0, 0, 0, 1, 0, 1, 1),
  c(1, 0, 1, 1, 1, 0, 0, 0, 1, 0, 1),
  c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0));
H12<-2*H12-1
X1<-H12[,c(1:5)]
X<-X1
for (i in 1:4) { for (j in (i+1):5) {X<-cbind(X,X1[,i]*X1[,j])}}
X
```

```
##       [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10] [,11] [,12] [,13]
##  [1,]    1    1   -1    1    1    1   -1    1    1    -1     1     1    -1
##  [2,]   -1    1    1   -1    1   -1   -1    1   -1     1    -1     1    -1
##  [3,]    1   -1    1    1   -1   -1    1    1   -1    -1    -1     1     1
##  [4,]   -1    1   -1    1    1   -1    1   -1   -1    -1     1     1    -1
##  [5,]   -1   -1    1   -1    1    1   -1    1   -1    -1     1    -1    -1
##  [6,]   -1   -1   -1    1   -1    1    1   -1    1     1    -1     1    -1
##  [7,]    1   -1   -1   -1    1   -1   -1   -1    1     1     1    -1     1
##  [8,]    1    1   -1   -1   -1    1   -1   -1   -1    -1    -1    -1     1
##  [9,]    1    1    1   -1   -1    1    1   -1   -1     1    -1    -1    -1
## [10,]   -1    1    1    1   -1   -1   -1   -1    1     1     1    -1     1
## [11,]    1   -1    1    1    1   -1    1    1    1    -1    -1    -1     1
## [12,]   -1   -1   -1   -1   -1    1    1    1    1     1     1     1     1
##       [,14] [,15]
##  [1,]    -1     1
```

```
##  [2,]     1    -1
##  [3,]    -1    -1
##  [4,]    -1     1
##  [5,]     1    -1
##  [6,]     1    -1
##  [7,]    -1    -1
##  [8,]     1     1
##  [9,]    -1     1
## [10,]    -1    -1
## [11,]     1     1
## [12,]     1     1
```

```
X2<-X[,c(6:15)]
X2
```

```
##       [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]
##  [1,]    1   -1    1    1   -1    1    1   -1   -1     1
##  [2,]   -1   -1    1   -1    1   -1    1   -1    1    -1
##  [3,]   -1    1    1   -1   -1   -1    1    1   -1    -1
##  [4,]   -1    1   -1   -1   -1    1    1   -1   -1     1
##  [5,]    1   -1    1   -1   -1    1   -1   -1    1    -1
##  [6,]    1    1   -1    1    1   -1    1   -1    1    -1
##  [7,]   -1   -1   -1    1    1    1   -1    1   -1    -1
##  [8,]    1   -1   -1   -1   -1   -1   -1    1    1     1
##  [9,]    1    1   -1   -1    1   -1   -1   -1   -1     1
## [10,]   -1   -1   -1    1    1    1   -1    1   -1    -1
## [11,]   -1    1    1    1   -1   -1   -1    1    1     1
## [12,]    1    1    1    1    1    1    1    1    1     1
```

```
AliasMat<-solve(t(X1)%*%X1)%*%t(X1)%*%X2
AliasMatRnd<-round(AliasMat,3)
AliasMatRnd
```

```
##        [,1]   [,2]   [,3]   [,4]   [,5]   [,6]   [,7]   [,8]   [,9]  [,10]
## [1,]  0.000  0.000  0.000  0.000 -0.333 -0.333 -0.333  0.333 -0.333  0.333
## [2,]  0.000 -0.333 -0.333 -0.333  0.000  0.000  0.000 -0.333 -0.333  0.333
## [3,] -0.333  0.000  0.333 -0.333  0.000 -0.333 -0.333  0.000  0.000 -0.333
## [4,] -0.333  0.333  0.000  0.333 -0.333  0.000  0.333  0.000 -0.333  0.000
## [5,] -0.333 -0.333  0.333  0.000 -0.333  0.333  0.000 -0.333  0.000  0.000
```