ANNEXURE

MACRO WRITTEN IN MICROSOFT EXCEL FOR STUDYING THE EFFECT OF INDIVIDUAL VARIABLES ON VOID CONTENT

Sub Reg_6var()

Dim Y, Y_MIN, TEMP, MIN, i, j, k As Double

'Reading the co-efficients of the equation
B0 = Cells(3, 2).Value
B1 = Cells(4, 2).Value
B2 = Cells(5, 2).Value
B3 = Cells(6, 2).Value
B4 = Cells(7, 2).Value
B5 = Cells(8, 2).Value
B6 = Cells(9, 2).Value
B11 = Cells(10, 2).Value
B22 = Cells(11, 2).Value
B33 = Cells(12, 2).Value
B44 = Cells(13, 2).Value
B55 = Cells(14, 2).Value
B66 = Cells(15, 2).Value
B12 = Cells(16, 2).Value
B13 = Cells(17, 2).Value
B14 = Cells(18, 2).Value
B15 = Cells(19, 2).Value
B16 = Cells(20, 2).Value
B23 = Cells(21, 2).Value
B24 = Cells(22, 2).Value
B25 = Cells(23, 2).Value
B26 = Cells(24, 2).Value
B34 = Cells(25, 2).Value
B35 = Cells(26, 2).Value
B36 = Cells(27, 2).Value
B45 = Cells(28, 2).Value
B46 = Cells(29, 2).Value
B56 = Cells(30, 2).Value

'Reading the increment levels desired for each variable
INC1 = Cells(31, 2).Value
INC2 = Cells(32, 2).Value
INC3 = Cells(33, 2).Value
INC4 = Cells(34, 2).Value
INC5 = Cells(35, 2).Value
INC6 = Cells(36, 2).Value

'Reading the minimum cut off level of void desired for writing data
L_lim = Cells(37, 2).Value

'Initialization of variables
Y_MIN = 1E+100
i = 3
j = 5
k = 5
'Writing the heading for each column in the TOTAL output sheet

    Sheets("out6").Select
    ActiveSheet.Cells.Clear
    ActiveSheet.Cells(1, 1).Value = "SL. NO"
    ActiveSheet.Cells(1, 2).Value = "X1"
    ActiveSheet.Cells(1, 3).Value = "X2"
    ActiveSheet.Cells(1, 4).Value = "X3"
    ActiveSheet.Cells(1, 5).Value = "X4"
    ActiveSheet.Cells(1, 6).Value = "X5"
    ActiveSheet.Cells(1, 7).Value = "X6"
    ActiveSheet.Cells(1, 8).Value = "Y"

'Writing the heading for each column in the MINIMUM VALUES output sheet

    Sheets("min6").Select
    ActiveSheet.Cells.Clear
    ActiveSheet.Cells(1, 1).Value = "SL. NO"
    ActiveSheet.Cells(1, 2).Value = "X1"
    ActiveSheet.Cells(1, 3).Value = "X2"
    ActiveSheet.Cells(1, 4).Value = "X3"
    ActiveSheet.Cells(1, 5).Value = "X4"
    ActiveSheet.Cells(1, 6).Value = "X5"
    ActiveSheet.Cells(1, 7).Value = "X6"
    ActiveSheet.Cells(1, 8).Value = "Y-MIN"
Calculating the Void content for all the possible combinations of variables

For XI = -1 To 1 Step INC1

For X2 = -1 To 1 Step INC2

For X3 = -1 To 1 Step INC3

For X4 = -1 To 1 Step INC4

For X5 = -1 To 1 Step INC5

For X6 = -1 To 1 Step INC6

Y = B0 + (B1 * XI + B2 * X2 + B3 * X3 + B4 * X4 + B5 * X5 + B6 * X6) + (B11 * XI^2 + B22 * X2^2 + B33 * X3^2 + B44 * X4^2 + B55 * X5^2 + B66 * X6^2) + (B12 * XI * X2 + B13 * XI * X3 + B14 * XI * X4 + B15 * XI * X5 + B16 * XI * X6 + B23 * X2 * X3 + B24 * X2 * X4 + B25 * X2 * X5 + B26 * X2 * X6 + B34 * X3 * X4 + B35 * X3 * X5 + B36 * X3 * X6 + B45 * X4 * X5 + B46 * X4 * X6 + B56 * X5 * X6)

Writing the details for all the possible combinations of variables if desired

If (UCase(Sheets("inputs6").Cells(3, 5).Value) = "Y") Then
  Sheets("out6").Select
  ActiveSheet.Cells(i, 1).Value = i - 2
  ActiveSheet.Cells(i, 2).Value = XI
  ActiveSheet.Cells(i, 3).Value = X2
  ActiveSheet.Cells(i, 4).Value = X3
  ActiveSheet.Cells(i, 5).Value = X4
  ActiveSheet.Cells(i, 6).Value = X5
  ActiveSheet.Cells(i, 7).Value = X6
  ActiveSheet.Cells(i, 8).Value = Y
End If
'Writing the details only for the combinations leading to SPECIFIED void content

If (UCase(Sheets("inputs6").Cells(4, 5).Value) = "Y") Then

If (Y < L_lim) Then
    Sheets("min6").Select
    ActiveSheet.Cells(j, 1).Value = i - 2
    ActiveSheet.Cells(j, 2).Value = X1
    ActiveSheet.Cells(j, 3).Value = X2
    ActiveSheet.Cells(j, 4).Value = X3
    ActiveSheet.Cells(j, 5).Value = X4
    ActiveSheet.Cells(j, 6).Value = X5
    ActiveSheet.Cells(j, 7).Value = X6
    ActiveSheet.Cells(j, 8).Value = Y

' Writing the details for the combination of variables leading to LEAST void content

If (Y < Y_MIN) Then
    Y_MIN = Y
    Sheets("min6").Select
    ActiveSheet.Cells(3, 1).Value = i - 2
    ActiveSheet.Cells(3, 2).Value = X1
    ActiveSheet.Cells(3, 3).Value = X2
    ActiveSheet.Cells(3, 4).Value = X3
    ActiveSheet.Cells(3, 5).Value = X4
    ActiveSheet.Cells(3, 6).Value = X5
    ActiveSheet.Cells(3, 7).Value = X6
    ActiveSheet.Cells(3, 8).Value = Y_MIN
End If
j = j + 1
End If
End If

i = i + 1

Next X6
Next X5
Next X4
Next X3
Next X2
Next X1

' Aligning & Formatting the output details
Sheets("out6").Select
Rows("1:1").Select

With Selection
  .HorizontalAlignment = xlCenter
  .VerticalAlignment = xlCenter
  .WrapText = False
  .Orientation = 0
  .ShrinkToFit = False
  .MergeCells = False
End With
Selection.Font.Bold = True
Rows("2:65536").Select
Selection.NumberFormat = "0.00"
With Selection
  .HorizontalAlignment = xlCenter
  .VerticalAlignment = xlCenter
  .WrapText = False
  .Orientation = 0
  .ShrinkToFit = False
  .MergeCells = False
End With

Sheets("min6").Select
Rows("1:1").Select

With Selection
  .HorizontalAlignment = xlCenter
  .VerticalAlignment = xlCenter
  .WrapText = False
  .Orientation = 0
  .ShrinkToFit = False
  .MergeCells = False
End With

Selection.Font.Bold = True
Rows("2:65536").Select
Selection.NumberFormat = "0.00"
  With Selection
    .HorizontalAlignment = xlCenter
    .VerticalAlignment = xlCenter
    .WrapText = False
    .Orientation = 0
.ShrinkToFit = False
.MergeCells = False

End With

End Sub

Input sheet of Excel Macro

Output sheet of Excel Macro