

## ภาคผนวก

### Source code

#### 1. Program Detailing

##### Sub GenerateT()

```
nx = Cells(2, 3).Value
Range("A10:J2000").Select
Selection.Clear
Call clearT
Range(Cells(7, 1), Cells(7 + 2 * nx, 10)).Select
Call makeGridT
For i = 1 To nx
    Cells(7 + 2 * i - 1, 4).Value = "L"
    Cells(7 + 2 * i, 4).Value = "R"
    Cells(7 + 2 * i - 1, 3).Value = Replace("Txx", "xx", i)
    -----
    Cells(7, 8).Select
    Selection.Copy
    Range(Cells(8, 8), Cells(7 + 2 * nx, 8)).Select
    Selection.PasteSpecial Paste:=xlPasteFormulas, Operation:=xlNone, _
    SkipBlanks:=False, Transpose:=False
    -----
    x = Cells(2, 3).Value
    Range(Cells(10, 1), Cells(10 + 2 * x - 3, 2)).Select
    With Selection.Interior
        .ColorIndex = 48
        .Pattern = xlSolid
    End With
    x = Cells(2, 3).Value
    Range(Cells(10, 5), Cells(10 + 2 * x - 3, 10)).Select
    With Selection.Interior
        .ColorIndex = 40
        .Pattern = xlSolid
    End With
    x = Cells(2, 3).Value
    Range(Cells(10, 3), Cells(10 + 2 * x - 3, 4)).Select
    With Selection.Interior
        .ColorIndex = 37
        .Pattern = xlSolid
    End With
    x = Cells(2, 3).Value
```

```

Range(Cells(10, 8), Cells(10 + 2 * x - 3, 8)).Select
With Selection.Interior
    .ColorIndex = 34
    .Pattern = xlSolid
End With
Next i
End Sub

```

```

Sub RunT()
    Sheets("Output").Select
    Range("A7:AB2000").Select
    Selection.Clear
    Sheets("Input").Select
    x = Cells(2, 3).Value
    Sheets("Output").Select
    Range(Cells(6, 1), Cells(6 + 2 * x - 3, 2)).Select
    With Selection.Interior
        .ColorIndex = 48
        .Pattern = xlSolid
    End With
    Sheets("Input").Select
    x = Cells(2, 3).Value
    Sheets("Output").Select
    Range(Cells(6, 5), Cells(6 + 2 * x - 3, 10)).Select
    With Selection.Interior
        .ColorIndex = 40
        .Pattern = xlSolid
    End With
    Sheets("Input").Select
    x = Cells(2, 3).Value
    Sheets("Output").Select
    Range(Cells(6, 3), Cells(6 + 2 * x - 3, 4)).Select
    With Selection.Interior
        .ColorIndex = 37
        .Pattern = xlSolid
    End With
    Sheets("Input").Select
    x = Cells(2, 3).Value
    Sheets("Output").Select
    Range(Cells(6, 8), Cells(6 + 2 * x - 3, 8)).Select
    With Selection.Interior
        .ColorIndex = 34
        .Pattern = xlSolid
    End With

```

```

End With
Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range(Cells(6, 10), Cells(6 + 2 * x - 3, 14)).Select
With Selection.Interior
    .ColorIndex = 34
    .Pattern = xlSolid
End With
Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range(Cells(6, 19), Cells(6 + 2 * x - 3, 28)).Select
With Selection.Interior
    .ColorIndex = 34
    .Pattern = xlSolid
End With
-----
Sheets("Input").Select
nx = Cells(2, 3).Value
Range(Cells(7, 1), Cells(7 + 2 * nx, 7)).Select
Selection.Copy
Sheets("Output").Select
Range("A3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
-----
Sheets("Output").Select
Cells(3, 8).Select
Selection.Copy
Range(Cells(4, 8), Cells(3 + 2 * nx, 8)).Select
Selection.PasteSpecial Paste:=xlPasteFormulas, Operation:=xlNone, _
SkipBlanks:=False, Transpose:=False
-----
Range(Cells(4, 9), Cells(5, 18)).Select
Selection.Copy
Range(Cells(4, 9), Cells(4 + nx * 2 - 1, 18)).Select
ActiveSheet.Paste
-----
Sheets("Input").Select
Range(Cells(7, 9), Cells(7 + 2 * nx, 9)).Select
Selection.Copy

```

```

Sheets("Output").Select
Range("O3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
-----

Sheets("Input").Select
Range(Cells(7, 10), Cells(7 + 2 * nx, 10)).Select
Selection.Copy
Sheets("Output").Select
Range("Q3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
-----

Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range("S5:AB6").Select
Selection.Copy
Range(Cells(7, 19), Cells(8 + 2 * x - 4, 28)).Select
Selection.PasteSpecial Paste:=xlPasteFormulas, Operation:=xlNone, _
SkipBlanks:=False, Transpose:=False
-----

Sheets("Input").Select
Range(Cells(4, 1), Cells(4, 5)).Select
Selection.Copy
Sheets("Output").Select
Range("s.3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
-----

Sheets("Input").Select
Range(Cells(4, 6), Cells(4, 7)).Select
Selection.Copy
Sheets("Output").Select
Range("aa3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
-----

Range(Cells(3, 1), Cells(4 + 2 * nx - 1, 28)).Select
Call makeGridF
End Sub

```

Sub GenerateT()

nx = Cells(2, 3).Value

Range("A10:J2000").Select

Selection.Clear

Call clearT

Range(Cells(7, 1), Cells(7 + 2 \* nx, 10)).Select

Call makeGridT

For i = 1 To nx

Cells(7 + 2 \* i - 1, 4).Value = "L"

Cells(7 + 2 \* i, 4).Value = "R"

Cells(7 + 2 \* i - 1, 3).Value = Replace("Txx", "xx", i)

Cells(7, 8).Select

Selection.Copy

Range(Cells(8, 8), Cells(7 + 2 \* nx, 8)).Select

Selection.PasteSpecial Paste:=xlPasteFormulas, Operation:=xlNone, \_

SkipBlanks:=False, Transpose:=False

x = Cells(2, 3).Value

Range(Cells(10, 1), Cells(10 + 2 \* x - 3, 2)).Select

With Selection.Interior

.ColorIndex = 48

.Pattern = xlSolid

End With

x = Cells(2, 3).Value

Range(Cells(10, 5), Cells(10 + 2 \* x - 3, 10)).Select

With Selection.Interior

.ColorIndex = 40

.Pattern = xlSolid

End With

y = Cells(2, 3).Value

Range(Cells(10, 3), Cells(10 + 2 \* x - 3, 4)).Select

With Selection.Interior

.ColorIndex = 37

.Pattern = xlSolid

End With

x = Cells(2, 3).Value

Range(Cells(10, 8), Cells(10 + 2 \* x - 3, 8)).Select

With Selection.Interior

.ColorIndex = 34

.Pattern = xlSolid

End With

Next i

End Sub

Sub RunT()

Sheets("Output").Select

Range("A7:AB2000").Select

Selection.Clear

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(6, 1), Cells(6 + 2 \* x - 3, 2)).Select

With Selection.Interior

.ColorIndex = 48

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(6, 5), Cells(6 + 2 \* x - 3, 10)).Select

With Selection.Interior

.ColorIndex = 40

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(6, 3), Cells(6 + 2 \* x - 3, 4)).Select

With Selection.Interior

.ColorIndex = 37

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(6, 8), Cells(6 + 2 \* x - 3, 8)).Select

With Selection.Interior

.ColorIndex = 34

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(6, 10), Cells(6 + 2 \* x - 3, 14)).Select

With Selection.Interior

```

        .ColorIndex = 34
        .Pattern = xlSolid
    End With
    Sheets("Input").Select
    x = Cells(2, 3).Value
    Sheets("Output").Select
    Range(Cells(6, 19), Cells(6 + 2 * x - 3, 28)).Select
    With Selection.Interior
        .ColorIndex = 34
        .Pattern = xlSolid
    End With

    -----
    Sheets("Input").Select
    nx = Cells(2, 3).Value
    Range(Cells(7, 1), Cells(7 + 2 * nx, 7)).Select
    Selection.Copy
    Sheets("Output").Select
    Range("A3").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    -----
    Sheets("Output").Select
    Cells(3, 8).Select
    Selection.Copy
    Range(Cells(4, 8), Cells(3 + 2 * nx, 8)).Select
    Selection.PasteSpecial Paste:=xlPasteFormulas, Operation:=xlNone, _
        SkipBlanks:=False, Transpose:=False
    -----
    Range(Cells(4, 9), Cells(5, 18)).Select
    Selection.Copy
    Range(Cells(4, 9), Cells(4 + nx * 2 - 1, 18)).Select
    ActiveSheet.Paste
    -----
    Sheets("Input").Select
    Range(Cells(7, 9), Cells(7 + 2 * nx, 9)).Select
    Selection.Copy
    Sheets("Output").Select
    Range("C3").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    -----
    Sheets("Input").Select

```

```

Range(Cells(7, 10), Cells(7 + 2 * nx, 10)).Select
Selection.Copy
Sheets("Output").Select
Range("Q3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
'-----

Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range("S5:AB6").Select
Selection.Copy
Range(Cells(7, 19), Cells(8 + 2 * x - 4, 28)).Select
Selection.PasteSpecial Paste:=xlPasteFormulas, Operation:=xlNone, _
SkipBlanks:=False, Transpose:=False
'-----

Sheets("Input").Select
Range(Cells(4, 1), Cells(4, 5)).Select
Selection.Copy
Sheets("Output").Select
Range("s3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
'-----

Sheets("Input").Select
Range(Cells(4, 6), Cells(4, 7)).Select
Selection.Copy
Sheets("Output").Select
Range("aa3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
'-----

Range(Cells(3, 1), Cells(4 + 2 * nx - 1, 28)).Select
Call makeGridT
End Sub

```

## 2. Program Leveling

```
Sub LevelingReset()  
,  
' LevelingReset Macro  
' Macro recorded 10/16/2006 by Sasikorn  
,  
  
Range("A5").Select  
Range(Selection, Selection.End(xlToRight)).Select  
Range(Selection, Selection.End(xlDown)).Select  
Selection.ClearContents  
Range("A5").Select  
End Sub  
Sub LevelingInput()  
x = Range("B2").Value  
For i = 1 To x  
Cells(4 + i, 11).Value = i  
Next i  
-----  
Sheets("Control").Select  
nx = Cells(2, 2).Value  
Sheets("ADJ").Select  
Range("A5:H2000").Select  
Selection.Clear  
Range("A4:H4").Select  
Selection.Copy  
Range(Cells(4, 1), Cells(5 + 1 * nx - 2, 8)).Select
```

```

Call makeGridT
For i = 1 To nx
Next i
'-----

Sheets("Control").Select
nx = Cells(2, 2).Value
Sheets("ADJ").Select
Range("A4:I14").Select
Selection.Copy
Range(Cells(4, 1), Cells(5 + 1 * nx - 2, 8)).Select
Selection.PasteSpecial Paste:=xlPasteFormulas, Operation:=xlNone, _
SkipBlanks:=False, Transpose:=False
'-----

Sheets("Control").Select
ny = Cells(2, 2).Value
Sheets("ADJ").Select
Range(Cells(4, 1), Cells(5 + 1 * ny - 2, 4)).Select
With Selection.Interior
    .ColorIndex = 40
    .Pattern = xlSolid
End With
Sheets("Control").Select
ny = Cells(2, 2).Value
Sheets("ADJ").Select
Range(Cells(4, 3), Cells(5 + 1 * ny - 2, 3)).Select
With Selection.Interior
    .ColorIndex = 34
    .Pattern = xlSolid
End With
Sheets("Control").Select
ny = Cells(2, 2).Value
Sheets("ADJ").Select
Range(Cells(4, 5), Cells(5 + 1 * ny - 2, 7)).Select
With Selection.Interior
    .ColorIndex = 34
    .Pattern = xlSolid
End With
Sheets("ADJ").Select
Range("K6:R7").Select
Selection.Copy
Sheets("ADJ").Select
Range(Cells(ny + 4, 1), Cells(ny + 4, 8)).Select
Selection.Insert Shift:=xlDown

```

End Sub

Sub LevelingRun()

x = Range("B2").Value

z = x

Y = 2

For i = 1 To x

z = z + Cells(4 + i, 2).Value

Cells(7, 8).Select

Selection.Copy

Range(Cells(8, 8), Cells(7 + 2 \* nx, 8)).Select

Selection.PasteSpecial Paste:=xlPasteFormulas, Operation:=xlNone, \_

SkipBlanks:=False, Transpose:=False

Next i

Sheets("NU\_loop-0").Select

Sheets("NU\_loop-0").Copy Before:=Sheets(3)

Sheets("NU\_loop-0 (2)").Select

Sheets("NU\_loop-0 (2)").Name = "NU\_loop-X"

Sheets("NU\_loop-X").Select

ActiveSheet.Unprotect

Range("A2:AE6").Select

Selection.Copy

Range(Cells(7, 1), Cells(5 \* z + 1, 31)).Select

Selection.Insert Shift:=xlDown

For j = 1 To x

h = Sheets("Control").Cells(4 + j, 2).Value

For i = 1 To h

Y = Y + 5

Cells(Y, 1).Value = Replace("TP xx", "xx", i)

Next i

Y = Y + 5

Cells(Y, 1).Value = Replace("NU xx", "xx", j)

Next j

Cells(Y, 1).Value = "NU 00"

Range(Cells(5 \* z + 2, 1), Cells(5 \* z + 6, 31)).Select

Selection.Copy

For j = x To 2 Step -1

h = Sheets("Control").Cells(4 + j, 2).Value

Y = Y + 5 \* h - 5

```

Range(Cells(Y, 1), Cells(Y + 4, 31)).Select
Selection.Insert Shift:=xlDown
Cells(Y, 1).Value = Replace("NU xx", "xx", j - 1)
'-----
Cells(Y + 1, 2).FormulaR1C1 = Replace("=SUM(R[-xx]C[16]:R[-2]C[16])", "xx", 5 * b + 2)
Range(Cells(Y + 1, 2), Cells(Y + 1, 7)).Select
Selection.FillRight
Cells(Y + 1, 10).FormulaR1C1 = Replace("=SUM(R[-xx]C[16]:R[-2]C[16])", "xx", 5 * b + 2)
Range(Cells(Y + 1, 10), Cells(Y + 1, 15)).Select
Selection.FillRight
'-----
Range(Cells(Y, 1), Cells(Y + 4, 31)).Select
Selection.Copy
Next j
'-----
Y = 5 * z + 5 * x + 2 - 5
b = Sheets("Control").Cells(4 + x, 2).Value
Cells(Y + 1, 2).FormulaR1C1 = Replace("=SUM(R[-xx]C[16]:R[-2]C[16])", "xx", 5 * b + 2)
Range(Cells(Y + 1, 2), Cells(Y + 1, 7)).Select
Selection.FillRight
Cells(Y + 1, 10).FormulaR1C1 = Replace("=SUM(R[-xx]C[16]:R[-2]C[16])", "xx", 5 * b + 2)
Range(Cells(Y + 1, 10), Cells(Y + 1, 15)).Select
Selection.FillRight
'-----
ActiveSheet.Protect DrawingObjects:=True, Contents:=True, Scenarios:=True
Range("B3").Select
'-----
Columns("A:A").Select
Selection.Copy
Columns("I:I").Select
Sheets("NU_loop-0").Select
Application.CutCopyMode = False
Range("K18").Select
Sheets("NU_loop-X").Select
ActiveWindow.SmallScroll Down:=-18
Range("A1").Select
Selection.Copy
Columns("A:A").Select
Application.CutCopyMode = False
Selection.Copy
Columns("I:I").Select
Application.CutCopyMode = False
ActiveSheet.Unprotect

```



```

-----
Sheets("Output").Select
Range("Q4:F4").Select
Selection.Copy
Sheets("Output").Select
Range(Cells(5, 17), Cells(5 + 1 * nx - 1, 20)).Select
Selection.Insert Shift:=xlDown

```

```

-----
Sheets("Output").Select
Range("W10:AP12").Select
Selection.Copy
Sheets("Output").Select
Range(Cells(nx + 5, 1), Cells(nx + 5, 20)).Select
Selection.Insert Shift:=xlDown

```

```

-----
Sheets("Output").Select
Range(Cells(nx + 5, 1), Cells(nx + 5, 20)).Select
Selection.Copy
Sheets("Output").Select
Range("W14:AP14").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False

```

```

-----
Sheets("Output").Select
Range(Cells(nx + 6, 1), Cells(nx + 6, 20)).Select
Selection.Copy
Sheets("Output").Select
Range("W15:AP15").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False

```

```

-----
Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range(Cells(4, 1), Cells(4 + 1 * x, 4)).Select

```

**With Selection.Interior**

.ColorIndex = 40

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(4, 12), Cells(4 + 1 \* x, 12)).Select

With Selection.Interior

.ColorIndex = 40

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(5, 6), Cells(5 + 1 \* x - 1, 10)).Select

With Selection.Interior

.ColorIndex = 34

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(5, 14), Cells(5 + 1 \* x - 1, 14)).Select

With Selection.Interior

.ColorIndex = 34

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(5, 16), Cells(5 + 1 \* x - 1, 16)).Select

With Selection.Interior

.ColorIndex = 34

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(5, 5), Cells(5 + 1 \* x, 5)).Select

With Selection.Interior

.ColorIndex = 36

.Pattern = xlSolid

End With

Sheets("Input").Select

x = Cells(2, 3).Value

Sheets("Output").Select

Range(Cells(x + 4, 2), Cells(x + 4, 5)).Select

With Selection.Interior

.ColorIndex = 56

```

        .Pattern = xlSolid
End With
Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range(Cells(x + 5, 2), Cells(x + 5, 5)).Select
With Selection.Interior
    .ColorIndex = 56
    .Pattern = xlSolid
End With

```

```

'-----
Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range(Cells(4, 11), Cells(4 + 1 * x, 11)).Select
With Selection.Interior
    .ColorIndex = 36
    .Pattern = xlSolid
End With
Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range(Cells(5, 13), Cells(5 + 1 * x - 1, 13)).Select
With Selection.Interior
    .ColorIndex = 36
    .Pattern = xlSolid
End With
Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range(Cells(5, 15), Cells(5 + 1 * x - 1, 15)).Select
With Selection.Interior
    .ColorIndex = 36
    .Pattern = xlSolid
End With

```

```

'-----
Sheets("Input").Select
x = Cells(2, 3).Value
Sheets("Output").Select
Range(Cells(x + 4, 12), Cells(x + 4, 20)).Select
With Selection.Interior
    .ColorIndex = 56
    .Pattern = xlSolid

```

End With  
End Sub

