アライアンス・相互補完モデルの Python 言語のプログラミング

・cdata.xls のアライアンス対応表入力チェック VBA プログラム

ここから----------

```
Sub ボタン 1_Click()
    For i = 3 To 154
        For j = 3 To 154
            If Cells(i, j).Value = "1" Then
                If Not (Cells(j, i).Value = "1") Then
                    MsgBox "Please verify the relations between No." and j - 2 and " and
No." and i - 2 and " (maybe 1)."
                    Exit Sub
                End If
            ElseIf Cells(i, j).Value = "0" Then
                If Not (Cells(j, i).Value = "0") Then
                    MsgBox "Please verify the relations between No." and j - 2 and " and
No." and i - 2 and " (maybe 0)."
                    Exit Sub
                End If
            End If
        Next j
    Next i
```

End Sub

ここまで----------

・相互補完強度、強度係数算出用 Python プログラム

ここから----------

```
# -*- coding: utf-8 -*-

import xlrd, xlwt

import numpy as np

from math import sqrt


parameters = 8

parameter_start = 29


success_cols = (1,2,3,4,5,6,7)

fail_cols = (8,9,10,11,12,13,14)

all_cols = (15,16,17,18,19,20,21)

all_success_cols = (22,23,24,25,26,27,28)

all_success_fail_cols = (29,30,31,32,33,34,35)

all_fail_cols = (36,37,38,39,40,41,42)
```

```
def title():
        for i in success_cols:
                outputsheet.write(0, i, u'成立')
        for i in fail_cols:
                outputsheet.write(0, i, u'不成立')
        for i in all_cols:
                outputsheet.write(0, i, u'全体')
        for i in all_success_cols:
                outputsheet.write(0, i, u'全体-成立')
        for i in all_success_fail_cols:
                outputsheet.write(0, i, u'全-成-不')
        for i in all_fail_cols:
                outputsheet.write(0, i, u'全-不')
        outputsheet.write(1, 0, u'件数')
        outputsheet.write(2, 0, u'平均値')



def success(): #  成立
        relbook=xlrd.open_workbook('cdata.xls')
        relsheet=relbook.sheet_by_index(1)
        number, name1, name2, sum1, sum2, intensity, coefficient = (), (), (), (), (), (), ()
        for i in range(0, len(code)):
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```
                for j in range(0, len(code)):
                        vector = parameter_array(i,:) - parameter_array(j,:)
                        plus=0
                        minus=0
                        for k in range(len(vector)):
                                if vector(k)>0 : plus+=vector(k)
                                else : minus+=vector(k)
                        if relsheet.cell(code(i)+1,code(j)+1).value == 1 :
                                number.append(str(code(i)) + " - " +
str(code(j)))
                                name1.append(name(i))
                                name2.append(name(j))
                                sum1.append(sum(i))
                                sum2.append(sum(j))
                                intensity.append( sqrt( (2*(4*len(vector)/2))**2 )
- sqrt( (4*len(vector)/2-plus)**2 + (-4*len(vector)/2-minus)**2 ) )
                                coefficient.append( 1 - sqrt( (4*len(vector)/2-
plus)**2 + (-4*len(vector)/2-minus)**2 ) / sqrt( (2*(4*len(vector)/2))**2 ) )
        for i in success_cols:
                outputsheet.write(1, i, len(number))
        for i in range(0,len(number)):
                outputsheet.write(i+3, success_cols(0), number(i))
```

```
                outputsheet.write(i+3, success_cols(1), name1(i))
                outputsheet.write(i+3, success_cols(2), sum1(i))
                outputsheet.write(i+3, success_cols(3), name2(i))
                outputsheet.write(i+3, success_cols(4), sum2(i))
                outputsheet.write(i+3, success_cols(5), intensity(i))
                outputsheet.write(i+3, success_cols(6), coefficient(i))
        outputsheet.write(2, success_cols(2), np.average(sum1))
        outputsheet.write(2, success_cols(4), np.average(sum2))
        outputsheet.write(2, success_cols(5), np.average(intensity))
        outputsheet.write(2, success_cols(6), np.average(coefficient))


def fail(): # 不成立
        relbook=xlrd.open_workbook('cdata.xls')
        relsheet=relbook.sheet_by_index(1)
        number, name1, name2, sum1, sum2, intensity, coefficient = (), (), (), (), (), (), ()
        for i in range(0, len(code)):
                for j in range(0, len(code)):
                        vector = parameter_array(i,:) - parameter_array(j,:)
                        plus=0
                        minus=0
                        for k in range(len(vector)):
```

```
                                        if vector(k)>0 : plus+=vector(k)
                                        else : minus+=vector(k)
                                    if relsheet.cell(code(i)+1,code(j)+1).value == 0 :
                                        number.append(str(code(i)) + " - " +
str(code(j)))
                                        name1.append(name(i))
                                        name2.append(name(j))
                                        sum1.append(sum(i))
                                        sum2.append(sum(j))
                                        intensity.append( sqrt( (2*(4*len(vector)/2))**2 )
- sqrt( (4*len(vector)/2-plus)**2 + (-4*len(vector)/2-minus)**2 ) )
                                        coefficient.append( 1 - sqrt( (4*len(vector)/2-
plus)**2 + (-4*len(vector)/2-minus)**2 ) / sqrt( (2*(4*len(vector)/2))**2 ) )
            for i in fail_cols:
                outputsheet.write(1, i, len(number))
            for i in range(0,len(number)):
                outputsheet.write(i+3, fail_cols(0), number(i))
                outputsheet.write(i+3, fail_cols(1), name1(i))
                outputsheet.write(i+3, fail_cols(2), sum1(i))
                outputsheet.write(i+3, fail_cols(3), name2(i))
                outputsheet.write(i+3, fail_cols(4), sum2(i))
                outputsheet.write(i+3, fail_cols(5), intensity(i))
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```
                outputsheet.write(i+3, fail_cols(6), coefficient(i))
        outputsheet.write(2, fail_cols(2), np.average(sum1))
        outputsheet.write(2, fail_cols(4), np.average(sum2))
        outputsheet.write(2, fail_cols(5), np.average(intensity))
        outputsheet.write(2, fail_cols(6), np.average(coefficient))


def all(): #  全社
        relbook=xlrd.open_workbook('cdata.xls')
        relsheet=relbook.sheet_by_index(1)
        number, name1, name2, sum1, sum2, intensity, coefficient = (), (), (), (), (), (), ()
        for i in range(0, len(code)):
                for j in range(0, len(code)):
                        vector = parameter_array(i,:) - parameter_array(j,:)
                        plus=0
                        minus=0
                        for k in range(len(vector)):
                                if vector(k)>0 : plus+=vector(k)
                                else : minus+=vector(k)
                        if code(i) != code(j) :
                                number.append(str(code(i))  +  "  -  "  +
str(code(j)))
```

```
                                        name1.append(name(i))
                                        name2.append(name(j))
                                        sum1.append(sum(i))
                                        sum2.append(sum(j))
                                        intensity.append( sqrt( (2*(4*len(vector)/2))**2 )
- sqrt( (4*len(vector)/2-plus)**2 + (-4*len(vector)/2-minus)**2 ) )
                                        coefficient.append( 1 - sqrt( (4*len(vector)/2-
plus)**2 + (-4*len(vector)/2-minus)**2 ) / sqrt( (2*(4*len(vector)/2))**2 ) )
            for i in all_cols:
                  outputsheet.write(1, i, len(number))
            for i in range(0,len(number)):
                  outputsheet.write(i+3, all_cols(0), number(i))
                  outputsheet.write(i+3, all_cols(1), name1(i))
                  outputsheet.write(i+3, all_cols(2), sum1(i))
                  outputsheet.write(i+3, all_cols(3), name2(i))
                  outputsheet.write(i+3, all_cols(4), sum2(i))
                  outputsheet.write(i+3, all_cols(5), intensity(i))
                  outputsheet.write(i+3, all_cols(6), coefficient(i))
            outputsheet.write(2, all_cols(2), np.average(sum1))
            outputsheet.write(2, all_cols(4), np.average(sum2))
            outputsheet.write(2, all_cols(5), np.average(intensity))
            outputsheet.write(2, all_cols(6), np.average(coefficient))
```

```
def all_success(): #  全社-成立
        relbook=xlrd.open_workbook('cdata.xls')
        relsheet=relbook.sheet_by_index(1)
        number, name1, name2, sum1, sum2, intensity, coefficient = (), (), (), (), (), (), ()
        for i in range(0, len(code)):
                for j in range(0, len(code)):
                        vector = parameter_array(i,:) - parameter_array(j,:)
                        plus=0
                        minus=0
                        for k in range(len(vector)):
                                if vector(k)>0 : plus+=vector(k)
                                else : minus+=vector(k)
                        if  (relsheet.cell(code(i)+1,code(j)+1).value  !=  1)  and
(code(i) != code(j)):
                                number.append(str(code(i))  +  "  -  "  +
str(code(j)))
                                name1.append(name(i))
                                name2.append(name(j))
                                sum1.append(sum(i))
                                sum2.append(sum(j))
```

```
                                        intensity.append( sqrt( (2*(4*len(vector)/2))**2 )
- sqrt( (4*len(vector)/2-plus)**2 + (-4*len(vector)/2-minus)**2 ) )
                                        coefficient.append( 1 - sqrt( (4*len(vector)/2-
plus)**2 + (-4*len(vector)/2-minus)**2 ) / sqrt( (2*(4*len(vector)/2))**2 ) )
        for i in all_success_cols:
                outputsheet.write(1, i, len(number))
        for i in range(0,len(number)):
                outputsheet.write(i+3, all_success_cols(0), number(i))
                outputsheet.write(i+3, all_success_cols(1), name1(i))
                outputsheet.write(i+3, all_success_cols(2), sum1(i))
                outputsheet.write(i+3, all_success_cols(3), name2(i))
                outputsheet.write(i+3, all_success_cols(4), sum2(i))
                outputsheet.write(i+3, all_success_cols(5), intensity(i))
                outputsheet.write(i+3, all_success_cols(6), coefficient(i))
        outputsheet.write(2, all_success_cols(2), np.average(sum1))
        outputsheet.write(2, all_success_cols(4), np.average(sum2))
        outputsheet.write(2, all_success_cols(5), np.average(intensity))
        outputsheet.write(2, all_success_cols(6), np.average(coefficient))


def all_success_fail(): # 全社-成立-不成立
        relbook=xlrd.open_workbook('cdata.xls')
```

```
relsheet=relbook.sheet_by_index(1)
number, name1, name2, sum1, sum2, intensity, coefficient = (), (), (), (), (), (), ()
for i in range(0, len(code)):
    for j in range(0, len(code)):
        vector = parameter_array(i,:) - parameter_array(j,:)
        plus=0
        minus=0
        for k in range(len(vector)):
            if vector(k)>0 : plus+=vector(k)
            else : minus+=vector(k)
        if (relsheet.cell(code(i)+1,code(j)+1).value != 1) and (relsheet.cell(code(i)+1,code(j)+1).value != 0) and (code(i) != code(j)):
            number.append(str(code(i)) + " - " + str(code(j)))
            name1.append(name(i))
            name2.append(name(j))
            sum1.append(sum(i))
            sum2.append(sum(j))
            intensity.append( sqrt( (2*(4*len(vector)/2))**2 ) - sqrt( (4*len(vector)/2-plus)**2 + (-4*len(vector)/2-minus)**2 ) )
            coefficient.append( 1 - sqrt( (4*len(vector)/2-plus)**2 + (-4*len(vector)/2-minus)**2 ) / sqrt( (2*(4*len(vector)/2))**2 ) )
```

```
        for i in all_success_fail_cols:
                outputsheet.write(1, i, len(number))
        for i in range(0,len(number)):
                outputsheet.write(i+3, all_success_fail_cols(0), number(i))
                outputsheet.write(i+3, all_success_fail_cols(1), name1(i))
                outputsheet.write(i+3, all_success_fail_cols(2), sum1(i))
                outputsheet.write(i+3, all_success_fail_cols(3), name2(i))
                outputsheet.write(i+3, all_success_fail_cols(4), sum2(i))
                outputsheet.write(i+3, all_success_fail_cols(5), intensity(i))
                outputsheet.write(i+3, all_success_fail_cols(6), coefficient(i))
        outputsheet.write(2, all_success_fail_cols(2), np.average(sum1))
        outputsheet.write(2, all_success_fail_cols(4), np.average(sum2))
        outputsheet.write(2, all_success_fail_cols(5), np.average(intensity))
        outputsheet.write(2, all_success_fail_cols(6), np.average(coefficient))


def all_fail(): #  全社-不成立
        relbook=xlrd.open_workbook('cdata.xls')
        relsheet=relbook.sheet_by_index(1)
        number, name1, name2, sum1, sum2, intensity, coefficient = (), (), (), (), (), (), ()
        for i in range(0, len(code)):
                for j in range(0, len(code)):
```

```
                    vector = parameter_array(i,:) - parameter_array(j,:)
                    plus=0
                    minus=0
                    for k in range(len(vector)):
                        if vector(k)>0 : plus+=vector(k)
                        else : minus+=vector(k)
                    if (relsheet.cell(code(i)+1,code(j)+1).value != 0) and
(code(i) != code(j)):
                        number.append(str(code(i)) + " - " +
str(code(j)))
                        name1.append(name(i))
                        name2.append(name(j))
                        sum1.append(sum(i))
                        sum2.append(sum(j))
                        intensity.append( sqrt( (2*(4*len(vector)/2))**2 )
- sqrt( (4*len(vector)/2-plus)**2 + (-4*len(vector)/2-minus)**2 ) )
                        coefficient.append( 1 - sqrt( (4*len(vector)/2-
plus)**2 + (-4*len(vector)/2-minus)**2 ) / sqrt( (2*(4*len(vector)/2))**2 ) )
        for i in all_fail_cols:
            outputsheet.write(1, i, len(number))
        for i in range(0,len(number)):
            outputsheet.write(i+3, all_fail_cols(0), number(i))
```

```
                    outputsheet.write(i+3, all_fail_cols(1), name1(i))
                    outputsheet.write(i+3, all_fail_cols(2), sum1(i))
                    outputsheet.write(i+3, all_fail_cols(3), name2(i))
                    outputsheet.write(i+3, all_fail_cols(4), sum2(i))
                    outputsheet.write(i+3, all_fail_cols(5), intensity(i))
                    outputsheet.write(i+3, all_fail_cols(6), coefficient(i))
            outputsheet.write(2, all_fail_cols(2), np.average(sum1))
            outputsheet.write(2, all_fail_cols(4), np.average(sum2))
            outputsheet.write(2, all_fail_cols(5), np.average(intensity))
            outputsheet.write(2, all_fail_cols(6), np.average(coefficient))



inputbook=xlrd.open_workbook('cdata.xls')
inputsheet=inputbook.sheet_by_index(0)
code, name, sum = (), (), ()
parameter_array = np.zeros((0))
for row in range(11, inputsheet.nrows):
            code.append(int(inputsheet.cell(row,0).value))
            name.append(inputsheet.cell(row,1).value)
            sum.append(inputsheet.cell(row,37).value)
            parameter_record = np.zeros((0))
            for i in range(parameter_start, parameter_start+parameters):
```

parameter_record = np.append(parameter_record, int(inputsheet.cell(row,i).value))

parameter_array = np.concatenate((parameter_array, parameter_record), axis=0)

parameter_array.resize((len(code), parameters))

outputbook=xlwt.Workbook()

outputsheet=outputbook.add_sheet('sheet 1')

title()

success()

fail()

all()

all_success()

all_success_fail()

all_fail()

outputbook.save('comp.xls')

ここまで----------