import numpy

import sympy

#1 corresponds to Equally important

#2-3 correspond to weakly more important

#4-5 corresponds to strongly more important

#6-7 correspond to very strongly more important

#8-9 correspond to absolutely more important

Equal = (1.0,1.0,1.0)

EqI = (.5,1.0,1.5)

InvEqI=(2.0/3.0,1.0,2.0)

Weak = (1,1.5,2)

InvWeak=(1/2,2/3,1)

Strong = (1.5,2,5/2)

InvStrong=(2/5,1/2,2/3)

Very = (2,5/2,3)

InvVery=(1/3,2/5,1/2)

Abs=(5/2,3,7/2)

InvAbs=(2/7,1/3,2/5)

SafetyLine1=[Equal, Equal, Weak,Strong,Strong, Strong]

SafetyLine2=[InvWeak, InvStrong, Equal, Equal, EqI,EqI]

SafetyLine3=[InvStrong, InvStrong,InvEqI, InvEqI,Equal, Equal]

FluctuateLine1 = [Equal, Equal,EqI,EqI,Strong, Abs],

FluctuateLine2= [InvEqI, InvEqI, Equal, Equal, Abs, Abs]

FluctuateLine3= [InvStrong, InvAbs, InvAbs, InvAbs, Equal, Equal]

ProfitabilityLine1 = [Equal, Equal,InvVery,EqI,EqI, InvVery]

ProfitabilityLine2 = [Very, InvEqI, Equal, Equal, EqI, EqI]

ProfitabilityLine3 = [InvEqI, Very, InvEqI, InvEqI, Equal, Equal]

CharLine1=[Equal, Equal,Very,Abs,Abs, Abs]

CharLine2=[InvVery, InvAbs, Equal, Equal, Abs, Very]

CharLine3=[InvAbs, InvAbs, InvAbs, InvVery, Equal, Equal]

#Find the first (0th) value in each tuple in the first 6 spots,

#take the natural log and add them together

#Since ln(1)=0, it is ok to include the Equal point

def LnSumCalculator(LineList, LineNumber):

values = [x[LineNumber] for x in LineList]

LnList = [0]\*len(LineList)

for i in range(len(LineList)):

LnList.append(numpy.log(values[i]))

return(sum(LnList))

NumDeciders = len(SafetyLine1)/3

NumDecisions = len(SafetyLine1)-NumDeciders

Ans1=LnSumCalculator(SafetyLine1, 0)

Ans2=LnSumCalculator(SafetyLine2, 0)

Ans3=LnSumCalculator(SafetyLine3, 0)

Ans4=LnSumCalculator(SafetyLine1, 1)

Ans5=LnSumCalculator(SafetyLine2, 1)

Ans6=LnSumCalculator(SafetyLine3, 1)

Ans7=LnSumCalculator(SafetyLine1, 2)

Ans8=LnSumCalculator(SafetyLine2, 2)

Ans9=LnSumCalculator(SafetyLine3, 2)

#Generate a matrix with all of the l and u values

def Matrix(FirstAns, SecondAns, ThirdAns, ForthAns, FifthAns, SixthAns,)

A = sympy.Matrix([NumDecisions, 0, 0, 0, -NumDeciders, -NumDeciders, ]).rref()

print(A)

print("Safety Line 1 Spot 1: ", LnSumCalculator(SafetyLine1, 0))

print("Safety Line 1 Spot 2: ", LnSumCalculator(SafetyLine1, 1))

print("Safety Line 2 Spot 1: ", LnSumCalculator(SafetyLine2, 0))

print("Safety Line 3 Spot 1: ", LnSumCalculator(SafetyLine3, 0))