

PyTOPS v0.1 Manual

The zip file has two sub files (i) PyTOPS.msi for Microsoft Windows and (ii) PyTOPS.py for Linux.

INSTALLATION

(i) For Microsoft Windows

- Double click on PyTOPS.msi
- On Welcome to the PyTOPS setup wizard press “Next”.
- Give path to the folder you wish to install PyTOPS
- Hit Install
- PyTOPS icon should come on Desktop and Start menu.

(ii) For Linux

- Copy PyTOPS.py to the desired folder
- Install Python3 (if not already installed)
- Check required dependencies (sklearn, OrderedDict, math, xlrd, random, sys, numpy, PyQt5)
- List all missing dependencies (If any)
- Install required missing dependencies using pip3 (e.g. pip3 install *missing_dependencies*)
- Run python3 PyTOPS.py
- Graphical user interface of PyTOPS should open now

WORKING

(a) Inputs:

1. *Input attribute type in list form:* This is a simple text box. You need to provide the order of benefit and cost type attributes and give binary values (0 and 1) accordingly. 0 is assigned to benefit type and 1 is assigned to cost type. For example, if you have 10 attributes, out of which attribute 1, 2, 5 and 8 are benefit type and rest are cost type; then you will have to type “0,0,1,1,0,1,1,0,1,1” (without inverted commas).

2. *Upload decision matrix:* The acceptable format is .xlsx, which can be generated using many free and open source softwares such as LibreOffice Calc and Google Sheets. The attributes of decision matrix should be taken as columns of the spreadsheet and rows should be the alternatives. You can easily upload this file with the help of “Decision Matrix” push button. Example file “Decision_matrix_example_problem.xlsx” is provided for reference.

3. *Upload weights:* The acceptable format for this file is also .xlsx, similar to decision matrix. The weights should be given corresponding the column of the attributes in the decision matrix. Manifestly, this spreadsheet will have only one row and the number of columns should be equal to the number of attributes. Example file “Weights_example_problem.xlsx” is provided for reference.

4. *Degree of variation in weights:* If user is willing to have the variation of 25% in the given values of weights in component 3, then the value 0.25 has to be chosen in this spin box with the help of the scroll bar. This component provide up to 100% variation in the given weights. If user wish to have no variation, then 0.00 should be taken as value of this component. The default value is 0.00 for this function.

5. *Number of simulations*: Multiple (up to a million) simulations can be performed within the given variation in weights. This function take uniformly distributed points from the given range in the weights variation. The default value is 0 for this function. The user should take the value 1 if he/she wants to run it once.

(a) Outputs:

RUN: This push button run the script and fill other components (1, 2 and 3) of Outputs component.

1. *Rank with varying weights*: This text box prints Rank of the alternatives with the chosen weights from the range provided in component 4 of Inputs. For example, if there are three alternatives (A1, A2, A3) and four attributes A1, A2, A3 and A4 with weights 0.25, 0.25, 0.25 and 0.25 respectively. Now consider in one simulation with 0.5 (50% variation) degree of variation PyTOPS choses 0.20, 0.30, 0.25 and 0.25; then this text box prints for all given simulation in loop fashion as:

[0.20, 0.30, 0.25, 0.25]

A3 > A2 > A1; and so on for all simulations. The content of this box can be saved with .txt extension using save tool button.

2. *Probability of rank reversal*: This text box prints the rank of alternatives and their respective probability of rank reversal in two column fashion. The content of this text box can be saved as txt file using save tool button.

3. *Mean of relative closeness to ideal solution*: This text box prints mean of all relative closenesses in each simulation in two column fashion. The content of this text box can be saved as txt file using save tool button.

4. *Standard deviation of relative closeness to ideal solution*: This text box prints standard deviation of all relative closenesses in each simulation in two column fashion. The content of this text box can be saved as txt file using save tool button.