Desciption

Suppose that an ICT project is consisted of nine activities that have normal and compressed durations and costs. The implementation of the project is delayed. The project management with the working groups define the following possible compression scenarios (in each scenario one or more activities are compressed).

Compression scenario	Duration (in days)	Direct cost (in Euro)
A1	33	46.100
A2	30	47.600
A3	26	50.000
A4	25	51.000
A5	21	55.400
A6	20	57.100
A7	18	61.700
A8	18	78.400

The indirect cost of the project has been estimated to be 1.000 Euros per day.

Questions

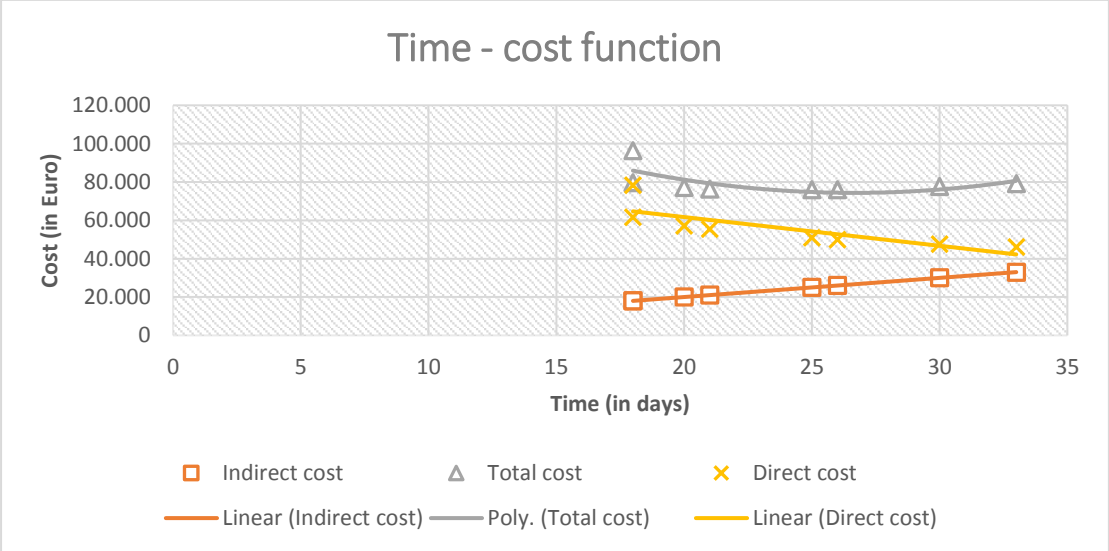
1) Design the direct, indirect and total cost functions for the project.
2) Indicate graphically the optimal compression scenario of the project duration that minimize the total cost of the project.

Solution

1) In order to draw the direct, indirect and total cost functions for the project we have to define for each compression scenario the corresponding values for each cost type (i.e. direct, indirect and total cost).

Compression scenario	Duration (in days)	Direct cost (in Euro)	Indirect cost (in Euro)	Total cost (in Euro)
A1	33	46.100	33 x 1000 = 33.000	46.100 + 33.000 = 79.100
A2	30	47.600	30.000	77.600
A3	26	50.000	26.000	76.000
A4	25	51.000	25.000	76.000
A5	21	55.400	21.000	76.400
A6	20	57.100	20.000	77.100
A7	18	61.700	18.000	79.700
A8	18	78.400	18.000	96.400

The graphical representation of the three cost functions is depicted below.



2) The optimal compression scenario is determined by the point that minimizes the total cost function. We notice that this minimum is between 25 and 26 weeks, with a total cost of 76,000 Euros. We choose A4 as optimal compression scenario as corresponds to fewer implementation days.

Alternatively, the optimal compression scenario can be defined directly from the above table. Looking at the last column we notice that initially the total cost decreases (points A1 & A2), until it is minimized (points A3 & A4) and then increases (points A5 – A8). As optimal compression scenario is chosen the scenario that minimizes the total cost (i.e. A3 & A4) and corresponds to fewer implementation days. So, the optimal compression scenario is A4.