Advanced Automation and Control

MILP example

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Problem description

A manager must decide how to invest 500000 Euros in different financial products. His goal is to maximize earnings while avoiding high risk exposure.

Financial products and expected return on investment

Financial product	Market	Return %
T1	Cars - Germany	10.3
T2	Computers USA	11.8
T3	Household appliances	12.2
T4	Insurance Germany	9.5
T5	Insurance USA	9.9
T6	BOT	3.6
T7	CCT	4.2

Investment constraints:

- No more than 150000 Euros in the car options
- No more than 150000 Euros in the computer options
- No more than 100000 Euros in the appliance options
- At least 100000 Euros in the insurance options
- At least 125000 Euros in BOT or CCT
- At least 40% of the money invested in CCT must be invested in BOT
- No more than 250000 Euros must be invested in German options
- No more than 200000 Euros must be invested in USA options
- You cannot invest in all the options
- You must choose at least one option
- Investment 1 cannot be chosen if 3 is chosen
- Investment 4 can be chosen only if at least 50000 are invested in option 1
- You must choose either both investments 2 and 5 or neither

Translate the problem above into the corresponding MILP.