IE 522 – Optimization Methods:

Capital budgeting (multiperiod)

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Capital Budgeting

- Suppose you are an investor, and you are considering investing in three projects.

- It is possible to invest in a fractional amount of a project or the entire amount. For example, if we invest in 0.5 of project 3, then we have cash outflows of -$1 million at time 0 and 0.5.) If you fully invest in a project, the realized cash flows, (in millions of dollars) will be as shown in the following Table.

- Today we have $2 million in cash. At each time period (0, 0.5, 1, 1.5, 2, and 2.5 years from today) we may, if desired, borrow up to $2 million at 3.5% (per 6 months) interest and must be paid back in the next period. Leftover cash earns 3% (per 6 months) interest. For example, if after borrowing and investing at time 0 we have $1 million we would receive $30,000 in interest at time 0.5 years.

- Your goal is to maximize cash on hand after accounting for time 3 cash flows. Formulate an LP to accomplish this goal. Solve using a solver of your choice.

Data

Time (Years)	Cash Flow		
	Project 1	Project 2	Project 3
0	-3	-2	-2
0.5	-1	-0.5	-2
1	1.8	1.5	-1.8
1.5	1.4	1.5	1
2	1.8	1.5	1
2.5	1.8	0.2	1
3	5.5	-1	6

Solution: Variables

Solution: Model

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