

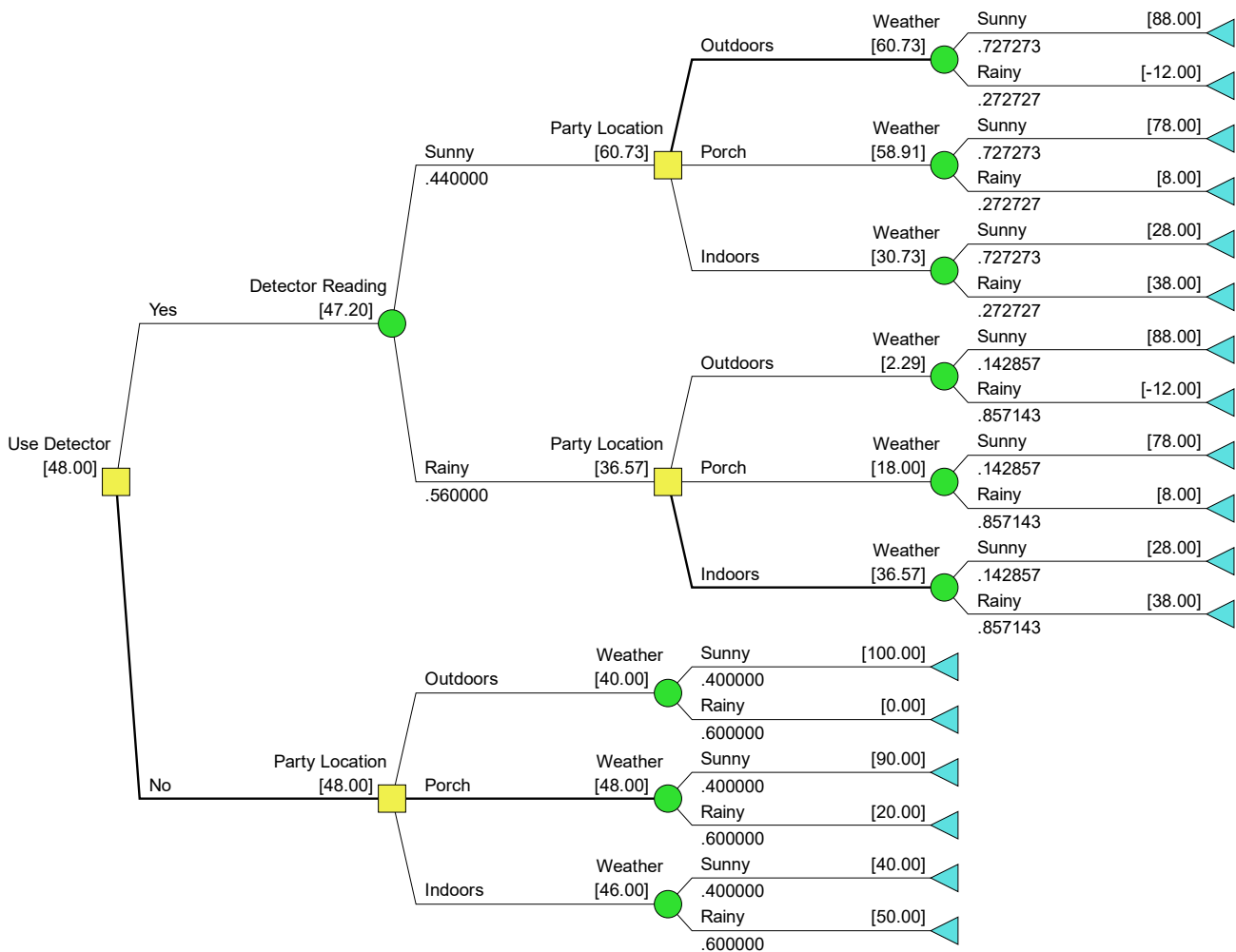
Chapter 4.extra

How to draw risk profile of initial alternatives when there are multiple sequential decisions

Example:

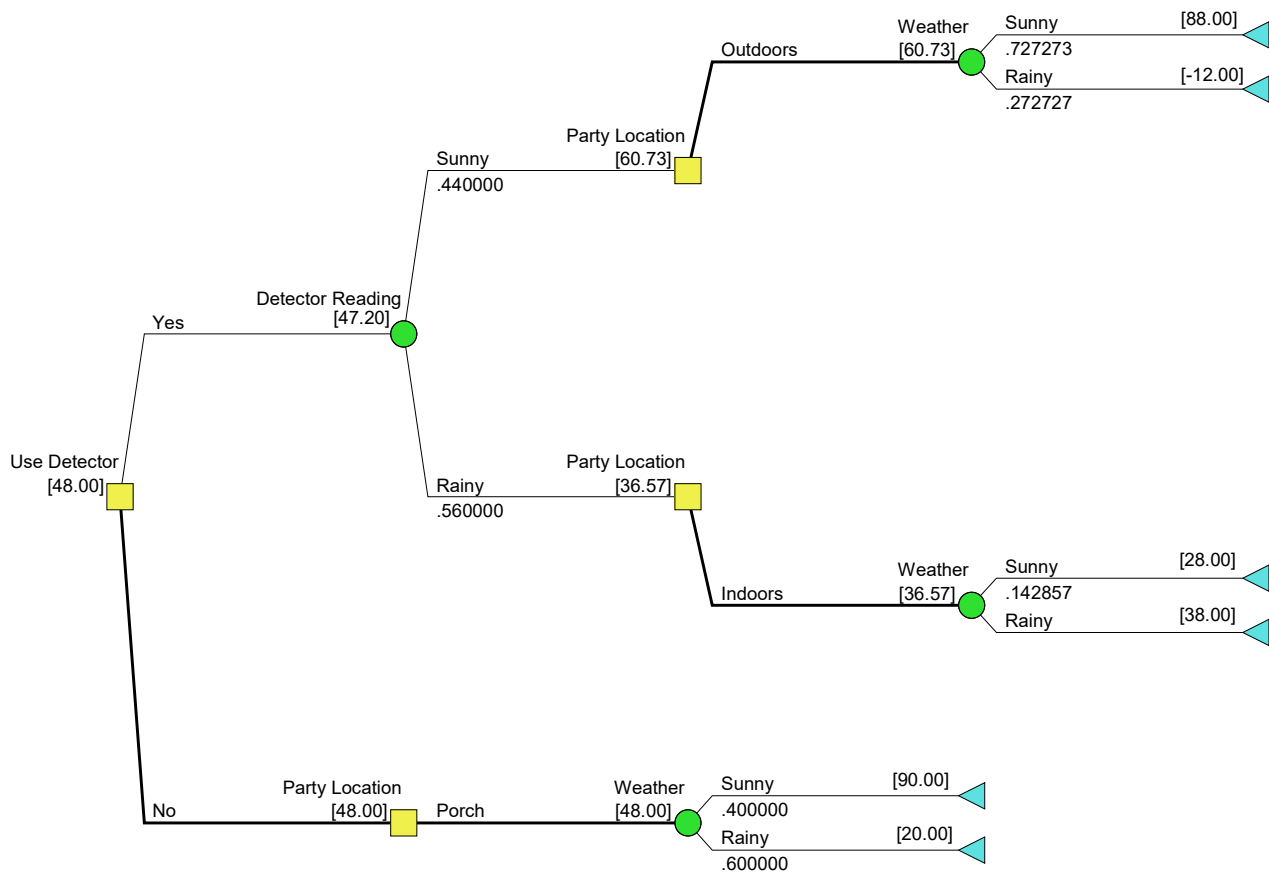
Consider Jane's Party Problem with decision to use a rain detector at \$12 or not.

1. Generate Optimal Decision Policy Tree:



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2. Prune None Optimal Decision Sub-Trees.



3. Extract end-point probabilities and values

Initial Alternative: Use Detector

| End point | Probability | Value |
|-----------|----------------------------------|-------|
| 1 | $0.44 \times 0.727272727 = 0.32$ | 88 |
| 2 | $0.44 \times 0.272727273 = 0.12$ | -12 |
| 3 | $0.56 \times 0.142857143 = 0.08$ | 28 |
| 4 | $0.56 \times 0.857142857 = 0.48$ | 38 |

Initial Alternative: No detector

| End point | Probability | Value |
|-----------|-------------|-------|
| 1 | 0.4 | 90 |
| 2 | 0.6 | 20 |

4. Sort probabilities table by value:

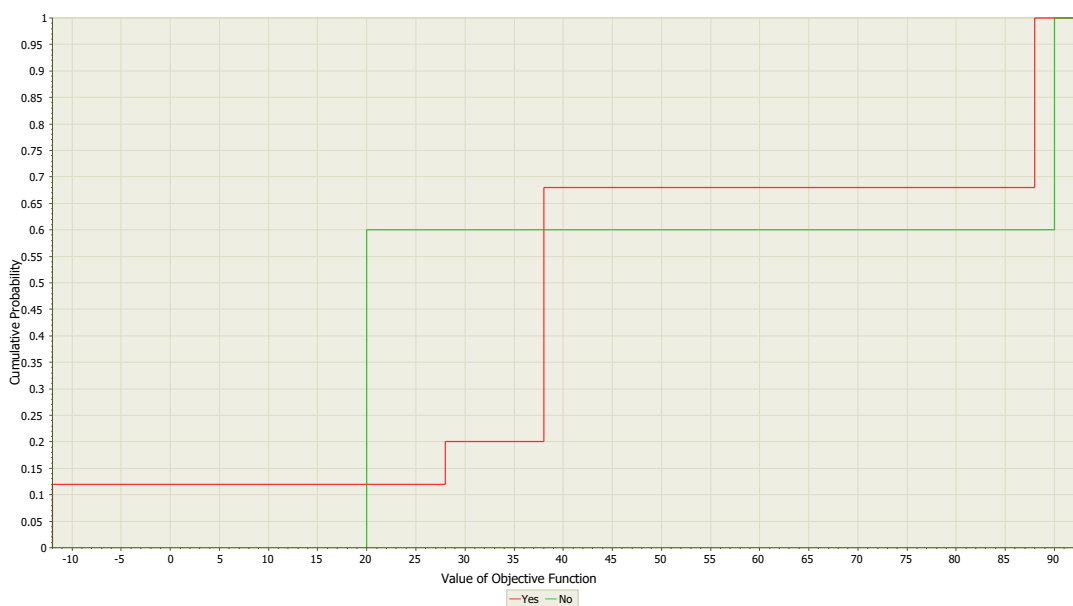
Initial Alternative: Use Detector

| End point | Probability | Value |
|-----------|----------------------------------|-------|
| 1 | $0.44 \times 0.272727273 = 0.12$ | -12 |
| 2 | $0.56 \times 0.142857143 = 0.08$ | 28 |
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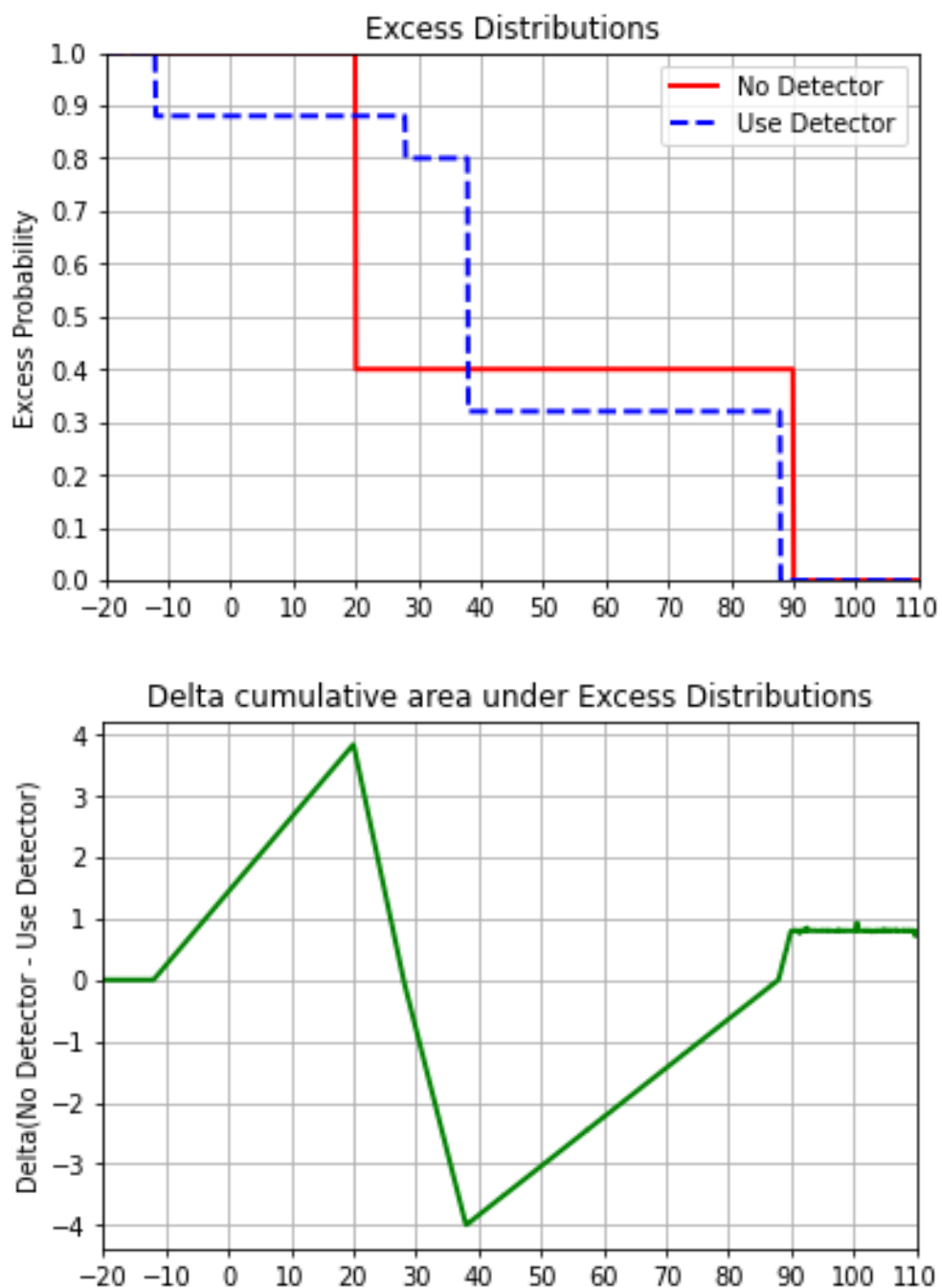
Initial Alternative: No detector

| End point | Probability | Value |
|-----------|-------------|-------|
| 1 | 0.6 | 20 |
| 2 | 0.4 | 90 |

5. Plot Risk Profiles of Initial Decision Alternatives:



6. Check for Second Order Stochastic Dominance



Result: No Detector does not 2SD Use Detector.