

Branch and Bound : Encoding Exceedance Constraints

Adding an Exceedance Constraint to a Tableau

- ▶ Suppose we are to add a constraint such as $x_1 \geq 10$ to a simplex tableau
- ▶ We **subtract** an introduced slack variable (lets call it x_5).
- ▶ We can restate the constraint as

$$x_1 - x_5 = 10$$

(or equivalently $x_5 - x_1 = -10$)

- ▶ **BE CAREFUL WITH SIGNS!**

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Inserting this into an expanded simplex tableau

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... |
| 10 | 1 | 0 | 0 | 0 | -1 |

or equivalently

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... |
| -10 | -1 | 0 | 0 | 0 | 1 |

(Remark : Second version more useful as we are actually interested in slack variable specifically)