

# AMS 341: Midterm Formulas

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July 5, 2010

## 1 Standard Form

**Negative Variable** For  $x \leq 0$ ,  $x' = -x$ , then sub.

**Unrestricted** For unrestricted  $y$ ,  $y = y' - y''$

## 2 Special Cases

**Degenerate BFS** One or more basic variables = 0

**Non-degenerate BFS** All BVs are strictly positive

## 3 Big M Method

1. Introduce  $a_i$  into each row with no BV
2. Alter objective function to have undesirable Big M
3. Clean up, make sure no BVs have anything but identity col
4. Simplex on modified LP

**If artificial variable in basis, original is infeasible**

## 4 Two Phase Method

### Phase 1

- $\min w = a_1 + a_2 \dots a_m$
- Apply simplex
- At end, all artificial variables should = 0
- If not, infeasible

### Phase 2

- Switch objective function for original, get rid of artificial cols
- Canonicalize!

## 5 Sensitivity Analysis

- For graphical solving, RHS changes move line parallel to self.
- Otherwise, changes slope
- Cannot change RHS and coefficient at same time!

100% rule: If at least ONE constraint is tight (no slack...)

$$\sum \frac{|change|}{AI \text{ or } AD} \leq 1$$