Universität Erlangen-Nürnberg
Naturwissenschaftliche Fakultät I
Prof. Dr. K. Klamroth

30. 04. 2003

Linear and Network Optimization
Handout 2

Algorithm 2.15: The Simplex Method

Input: LP in standard form: $\min\{\underline{c}\,\underline{x} : A\underline{x} = \underline{b}, \underline{x} \geq \underline{0}\}$
and BFS $\underline{x} = (\underline{x}_B, \underline{x}_N)$ with respect to a given basis B.

Step 1: Find the simplex tableau $T(B)$

Step 2: If $t_{0j} \geq 0 \, \forall j = 1, \ldots, n$
then STOP, $\underline{x} = (\underline{x}_B, \underline{x}_N)$ with $x_{B(i)} = t_{in+1} (i = 1, \ldots, m), \underline{x}_N = \underline{0}$ and the objective value - t_{0n+1} is an optimal solution of LP.

Step 3: Choose j with $t_{0j} < 0$

Step 4: If $t_{ij} \leq 0 \, \forall i = 1, \ldots, m$
then STOP, the LP is unbounded.

Step 5: Identify $r \in \{1, \ldots, m\}$ such that $\frac{t_{rn+1}}{t_{rj}} = \min \left\{ \frac{t_{in+1}}{t_{ij}} : t_{ij} > 0, i \in \{1, \ldots, m\} \right\}$
and perform a pivot operation with t_{rj}.
Go to Step 2.