Pivoting

Pivoting Techniques

Naive pivoting:

1. Pivot on the next nonzero element to $a_{i,i}$ in the submatrix $A_{i..n,i..m}$

Partial pivoting:

1. Select row j such that $|a_{i,j}| = \max\{|a_{i,i}|, |a_{i,i+1}|, \ldots, |a_{i,N}|\}$
2. Swap rows i and j
3. Pivot on the new $a_{i,i}$

Scaled partial pivoting:

1. Compute each row's *scale factor* $s_i = \max_j |a_{i,j}|$
2. Select row j such that $|a_{i,j}/s_j| = \max\{|a_{i,i}/s_i|, |a_{i,i+1}/s_{i+1}|, \ldots, |a_{i,N}/s_N|\}$
3. Swap rows i and j
4. Pivot on the new $a_{i,i}$

Complete pivoting:

1. Choose $a_{i,j}$ the pivot element in the submatrix with the maximum value
2. Swap rows and columns to bring $a_{i,j}$ into position