

Modified Gram-Schmidt

for $i=1$ to n

$$v_i = a_i$$

for $i=1$ to n

$$r_{ii} = \|v_i\|$$

$$q_i = v_i / r_{ii}$$

for $j=i+1$ to n

$$r_{ij} = q_i^* v_j$$

$$v_j = v_j - r_{ij} q_i$$

Gaussian Elimination without Pivoting

$$U=A, L=I$$

for $k=1$ to $m-1$

for $j=k+1$ to m

$$l_{jk} = U_{jk} / U_{kk}$$

$$U_{j,k:m} = U_{j,k:m} - l_{jk} U_{k,k:m}$$

Householder QR Factorization

for $k=1$ to n

$$x = A_{k:m, k}$$

$$v_k = \text{sign}(x_1) \|x\|_2 e_1 + x$$

$$v_k = v_k / \|v_k\|_2$$

$$A_{k:m, k:m} = A_{k:m, k:m} - 2 v_k (v_k^* A_{k:m, k:m})$$