

$$A = G G^T$$

compare j-th columns of both sides

$$A(:,j) = G^T(1,j)*G(:,1) + G^T(2,j)*G(:,2) + \dots G^T(j,j)*G(:,j)$$

$$= G(j,1)*G(:,1) + G(j,2)*G(:,2) + \dots G(j,j)*G(:,j)$$

→

$$G(j,j)*G(:,j) = A(:,j) - G(j,1)*G(:,1) + G(j,2)*G(:,2)$$