Factorization (continued)

Note: Gram-Schmidt breaks down when a, b, c are not linearly independent (either B or C will be zero and so cannot be normalized).

What is the value of this factorization? Look at the normal equations:

$$A^T A\hat{x} = A^T b \Longleftrightarrow \underset{\text{invertible}}{R^T} \underbrace{Q^T Q}_{I} R\hat{x} = \underset{\text{invertible}}{R^T} Q^T b \Longleftrightarrow R\hat{x} = Q^T b$$

The last linear system for $\hat{x}$ is triangular and can easily be solved by back substitution!