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CFRM 460
Homework 7 Solutions
3/4/16

Question 1

Part (a)

$$A = QR$$

Given that A has dimensions $m \times n$,

$$\Rightarrow Q \text{ has dimensions } m \times m$$

$$\Rightarrow R \text{ has dimensions } m \times n$$

$$\text{Thus matrix } Q \text{ will be such that: } Q = \begin{bmatrix} q_{11} & q_{12} & \cdots & q_{1m} \\ q_{21} & q_{22} & \cdots & q_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ q_{m1} & q_{m2} & \cdots & q_{mm} \end{bmatrix}$$

$$\text{However, as } Q \text{ is an orthogonal matrix, it must be symmetric } \Rightarrow Q = Q^T$$

$$Q = Q^T \Rightarrow q_{ij} = q_{ji} \text{ with the conditions } \{i, j : i, j \leq m; i \neq j\}$$