$$G_{23} G_{13} G_{12} A = R \Rightarrow A = G_{12}^* G_{13}^* G_{23}^* R = (G_{23} G_{13} G_{12})^* R = QR$$

$$G_{12} = \begin{pmatrix} G & 0 \\ 0 & 1 \end{pmatrix} \qquad G = G_{23} G_{13} G_{12}$$

$$GA = R$$

$$A = G^* R \qquad Q = G^*$$

$$\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$$

$$\det(A) = \det(Q \cdot R) = \det(Q) \cdot \det(R)$$

$$1 = \det I = \det(Q^* Q) = \det Q^* \cdot \det Q$$

Q - komplexní $\Rightarrow$ jaký je vztah mezi $\det Q$ a $\det Q^*$ ?

Q - reálná, ortog.

$$\det Q^T = \det Q$$

$$\Rightarrow 1 = (\det Q)^2 \Rightarrow$$

$$\det Q = \pm 1$$

$Q^* = \overline{Q^T} \Rightarrow \det Q^* = \det \overline{Q^T} = \overline{\det Q^T} = \overline{\det Q}$ – pro lib. komplexní matici

$Q$ – unitární

$1 = \det I = \det Q^* Q = \overline{\det Q} \cdot \det Q \Rightarrow |\det Q| = 1 \quad \det Q^* = \frac{1}{\det Q}$

$|\det A| = |\det Q| \cdot |\det R| = |\det R| = \prod_{i=1}^{n} |r_{ii}|$

# QR algoritmus

$A = A_0 = Q_1 R_1 \rightarrow A_1 = R_1 Q_1$

$A_1 = Q_2 R_2 \rightarrow A_2 = R_2 Q_2$

$\vdots$

$A_{k-1} = Q_k R_k \rightarrow A_k = R_k Q_k$

$A_k$, $A$ - podobné

$A_1$, $A$ - podobné

$R_1 = Q_1^* A_0 \Rightarrow A_1 = Q_1^* A Q_1$

$R_2 = Q_2^* A_1 \Rightarrow A_2 = Q_2^* A_1 Q_2 = Q_2^* Q_1^* A Q_1 Q_2$

$A_2$, $A$ - podobné