1.11) $A_K = R_K Q_K + \mu_K I$

$A_{K+1} = Q_K R_K + \mu_K I$

Merging the two, we get:

$$A_K = Q_K^T (A_{K-1} - \mu_K I) Q_K + \mu_K I$$

$$= Q_K^T A_{K-1} Q_K - Q_K^T \mu_K I Q_K + \mu_K I$$

Since $Q_K^T Q_K = I$ because Q_K is orthogonal, we get:

$$A_K = Q_K^T A_{K-1} Q_K$$

For any matrix X, a transformation of $Q^T X Q$ preserves the eigenvalues of X. This is due to:

$$\det(X - \lambda I) = \det(Q^T X Q - \lambda I)$$

Therefore, the eigenvalues of A_K are the same eigenvalues of A_{K-1} for all $K \geq 1$.