$$\theta_0(n) = 1, \quad \theta_1(n) = \cos\frac{2\pi n}{T}, \quad \theta_2(n) = \sin\frac{2\pi n}{T}$$

$$A_0 = \begin{pmatrix} \theta_0(1) & 0 & 0 \\ \theta_1(2) & \theta_0(2) & 0 \\ \theta_2(3) & \theta_1(3) & \theta_0(3) \end{pmatrix}, \qquad A_1 = \begin{pmatrix} 0 & \theta_2(1) & \theta_1(1) \\ 0 & 0 & \theta_2(2) \\ 0 & 0 & 0 \end{pmatrix}.$$

We would like find

$$C = \begin{pmatrix} \Psi_0(1) & \Psi_1(1) & \Psi_2(1) \\ 0 & \Psi_0(2) & \Psi_1(2) \\ 0 & 0 & \Psi_0(3) \end{pmatrix}, \qquad H = \begin{pmatrix} 0 & 0 & 0 \\ \Psi_2(2) & 0 & 0 \\ \Psi_1(3) & \Psi_2(3) & 0 \end{pmatrix}.$$

such that

$$CC^* + HH^* = A_0A_0^* + A_1A_1^*.$$