

$$P = \begin{bmatrix} 1 & \chi_1(t_1) & \dots & \chi_{m_a}(t_1) & \varphi(|\chi(t_1) - \mathbf{c}_1|) & \dots & \varphi(|\chi(t_1) - \mathbf{c}_{m_b}|) \\ & & & \vdots & & & \\ 1 & \chi_1(t_N) & \dots & \chi_{m_a}(t_N) & \varphi(|\chi(t_N) - \mathbf{c}_1|) & \dots & \varphi(|\chi(t_N) - \mathbf{c}_{m_b}|) \end{bmatrix}$$

$$w_k = (a_0, a_1, \dots, a_{m_a}, b_1, \dots, b_{m_b})^T,$$

$$\mathbf{c}_i = \chi(m_a + ci \mod N), \quad c \in \mathbb{Z},$$

$$y_k = (\chi_k(t_1 + p), \dots, \chi_k(t_N + p))^T$$

$$Pw_k = y_k$$