

Proof of predictive deconvolution

For $\alpha=1$:

$$x(t) = (x_0, x_1, x_2, x_3, x_4)$$

$$d(t)=x(t+1) = (x_1, x_2, x_3, x_4, x_5)$$

Cross-correlation

$$g(t) = d(t) \otimes x(t) = x(t+1) \otimes x(t)$$

$$x_1, x_2, x_3, x_4, x_5$$

$$g(0) \quad x_0, x_1, x_2, x_3, x_4 \quad =x_0x_1+x_1x_2+x_2x_3+x_3x_4+x_4x_5$$

$$g(1) \quad x_0, x_1, x_2, x_3, x_4 \quad =x_0x_2+x_1x_3+x_2x_4+x_3x_5$$

$$g(2) \quad x_0, x_1, x_2, x_3, x_4 \quad =x_0x_3+x_1x_4+x_2x_5$$

$$g(3) \quad x_0, x_1, x_2, x_3, x_4 \quad =x_0x_4+x_1x_5$$

$$g(4) \quad x_0, x_1, x_2, x_3, x_4 \quad =x_0x_5$$

Auto-correlation

$$r(t) = x(t) \otimes x(t)$$

$$x_0, x_1, x_2, x_3, x_4, x_5$$

$$r(0) \quad x_0, x_1, x_2, x_3, x_4, x_5 \quad =x_0^2+x_1^2+x_2^2+x_3^2+x_4^2+x_5^2$$

$$r(1) \quad x_0, x_1, x_2, x_3, x_4, x_5 \quad = x_0x_1+x_1x_2+x_2x_3+x_3x_4+x_4x_5=g(0)$$

$$r(2) \quad x_0, x_1, x_2, x_3, x_4, x_5 \quad = x_0x_2+x_1x_3+x_2x_4+x_3x_5=g(1)$$

$$r(3) \quad x_0, x_1, x_2, x_3, x_4, x_5 \quad = x_0x_3+x_1x_4+x_2x_5=g(2)$$

$$r(4) \quad x_0, x_1, x_2, x_3, x_4, x_5 \quad = x_0x_4+x_1x_5=g(3)$$

$$r(5) \quad x_0, x_1, x_2, x_3, x_4, x_5 \quad =x_0x_5=g(4)$$