

已知参考信号 $x(n)$ 和混合信号 $y(n)$, $y(n)$ 形式如下

$$y(n) = \alpha_0 x(n - \tau_0) + e(n)$$

$x(n)$ 和 $e(n)$ 不相关

目标: 分离出 $e(n)$

不相关的两个变量 X 和 Y ，有下面等式成立

$$D(X + Y) = D(X) + D(Y)$$

$$D(X) \geq 0, \quad D(Y) \geq 0$$

$$\hat{e}(n) = y(n) - \alpha x(n - \tau)$$

$$\hat{e}(n) = e(n) + \alpha_0 x(n - \tau_0) - \alpha x(n - \tau)$$

$$D[\hat{e}(n)] = D[e(n) + \alpha_0 x(n - \tau_0) - \alpha x(n - \tau)]$$

$\because x(n)$ 与 $e(n)$ 无关

$$D[\hat{e}(n)] = D[e(n)] + D[\alpha_0 x(n - \tau_0) - \alpha x(n - \tau)]$$

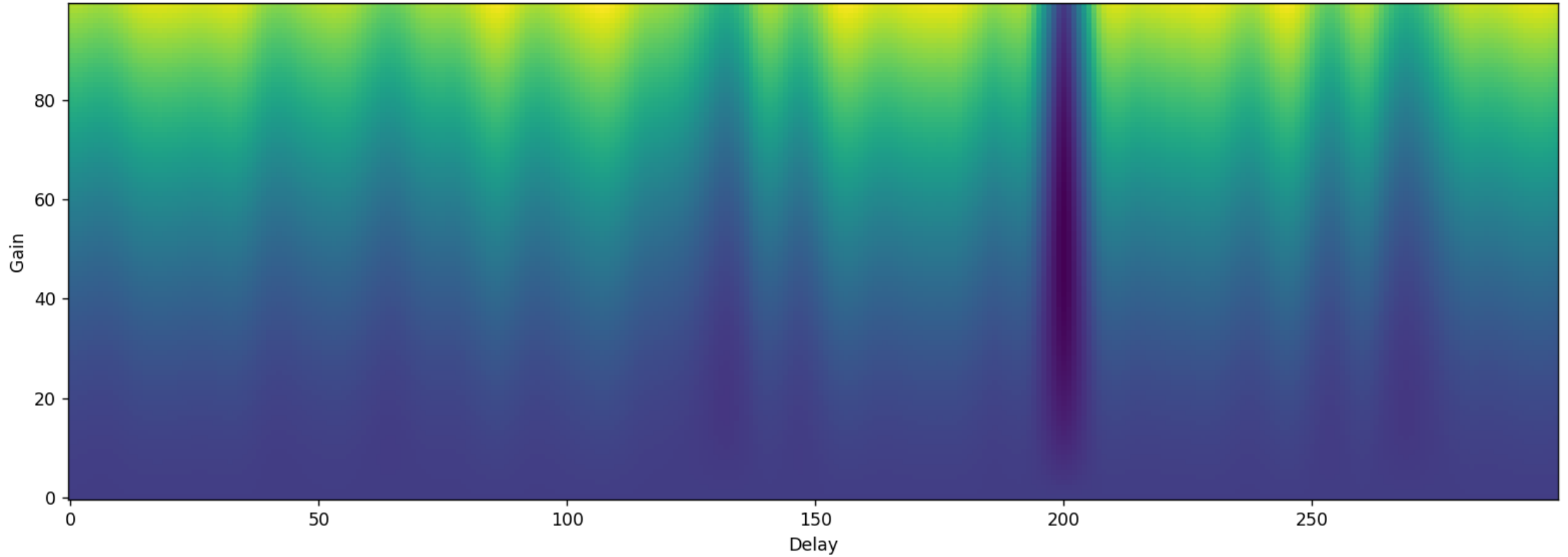
$$D[\hat{e}(n)] = D[e(n)] + D[\alpha_0 x(n - \tau_0) - \alpha x(n - \tau)]$$

当 $D[\alpha_0 x(n - \tau_0) - \alpha x(n - \tau)] = 0$ 时,

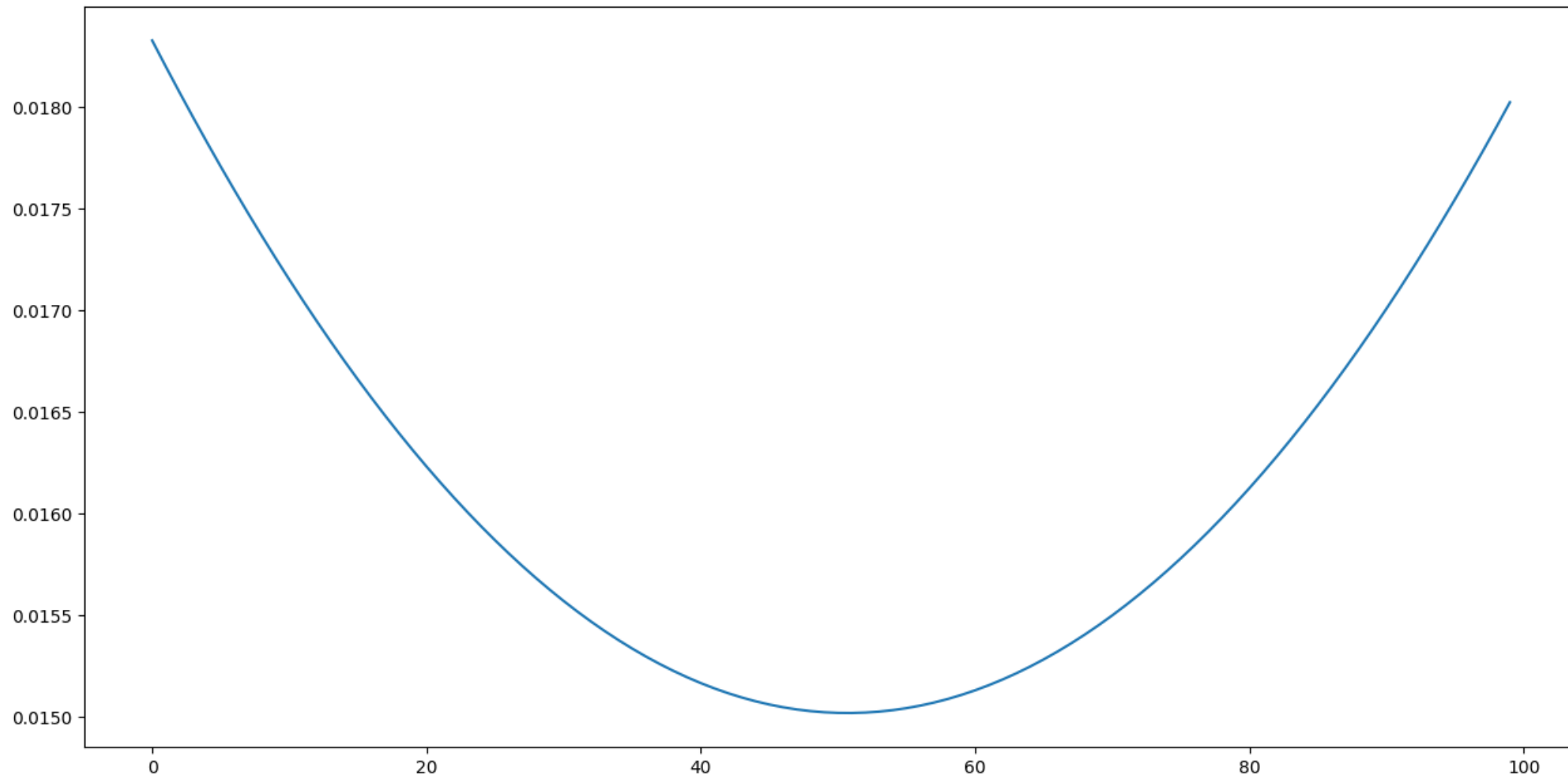
即,当 $\alpha = \alpha_0$ 且 $\tau = \tau_0$ 时,

$D[\hat{e}(n)]$ 取最小值 $D[e(n)]$

Variance of $e(n)$



$$y(n) = 0.5x(n - 200) + e(n)$$



当延时200时, $D[e(n)]$ 随 α 变化曲线