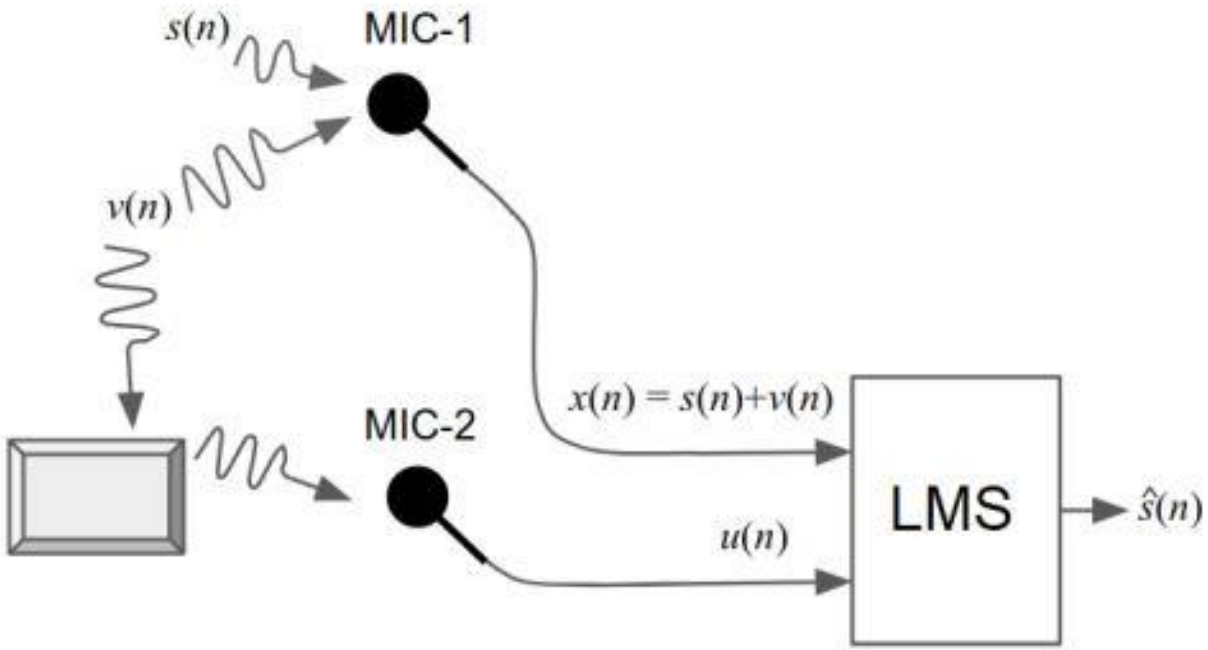
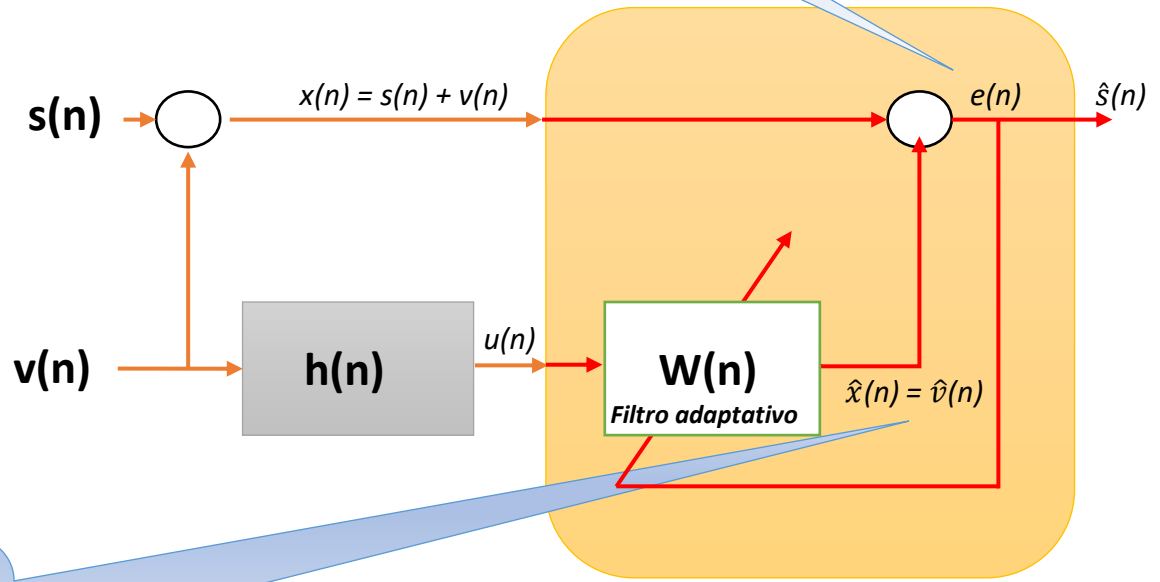
• Problema 1



El error es $x(n) - \hat{v}(n) = \hat{s}(n)$ de esa "resto" el ruido a mi señal estimando el ruido



u(n) es ruido captado del ambiente, correlacionado con v(n), estimo el ruido v(n) con u(n).

$x(n) = s(n) + v(n)$

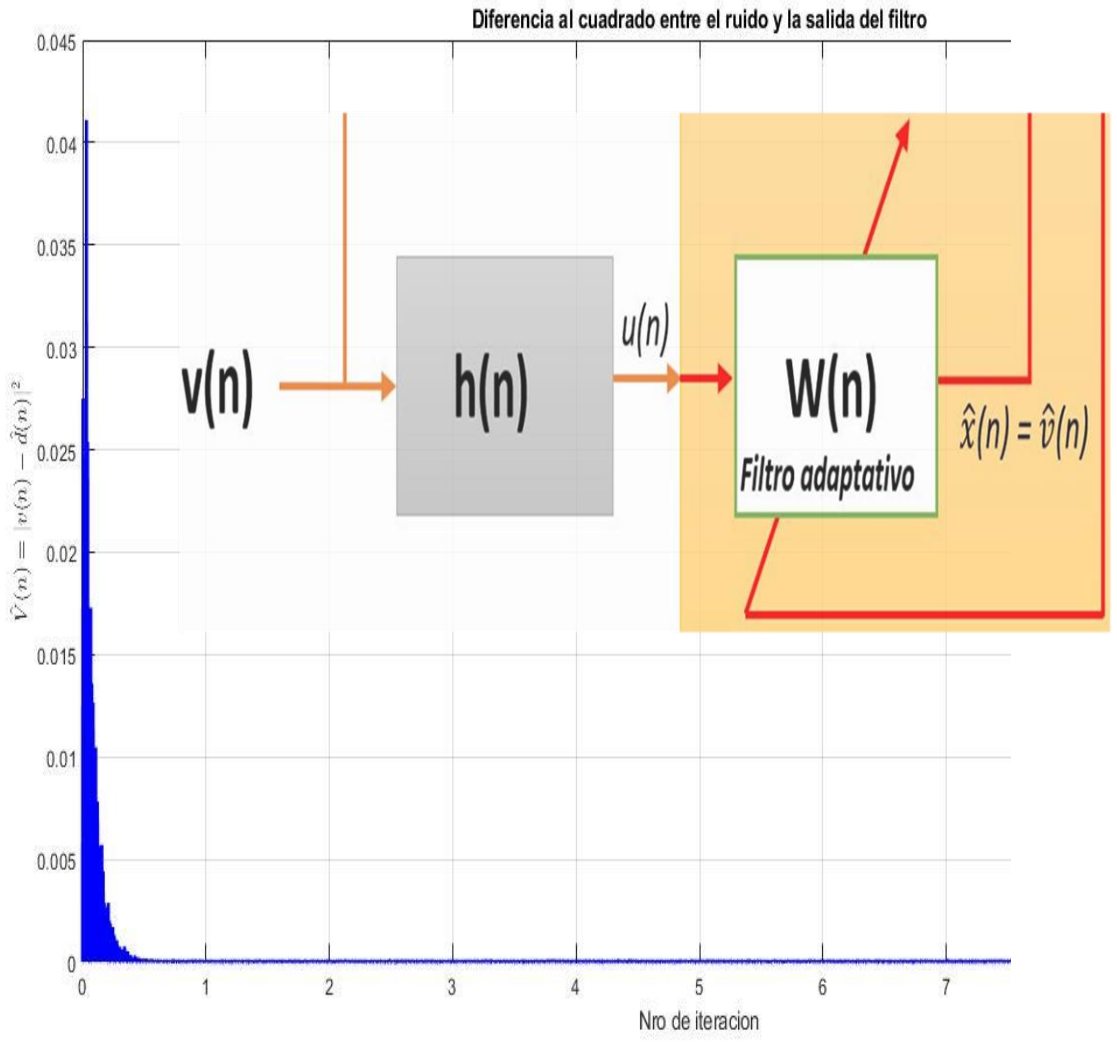
$$\mathbf{V} = \mathbf{E}[\,|v(n) - \hat{x}(n)|^2\,] = \mathbf{E}[\,|v(n) - w^*.u(n)|^2\,] =$$
$$\mathbf{E}[(v(n) - w^*.u(n))\,(v(n) - w^*.u(n))^*] =$$
$$\mathbf{E}[v(n)v(n)^* - w^*.u(n)v(n) - v(n)u(n)^*w(n) + w^*.u(n)\,u(n)^*w(n)] =$$
$$\boldsymbol{V = \sigma_v^2 - w^*R_{u,v} - R_{v,u}w + w^*R_uw}$$

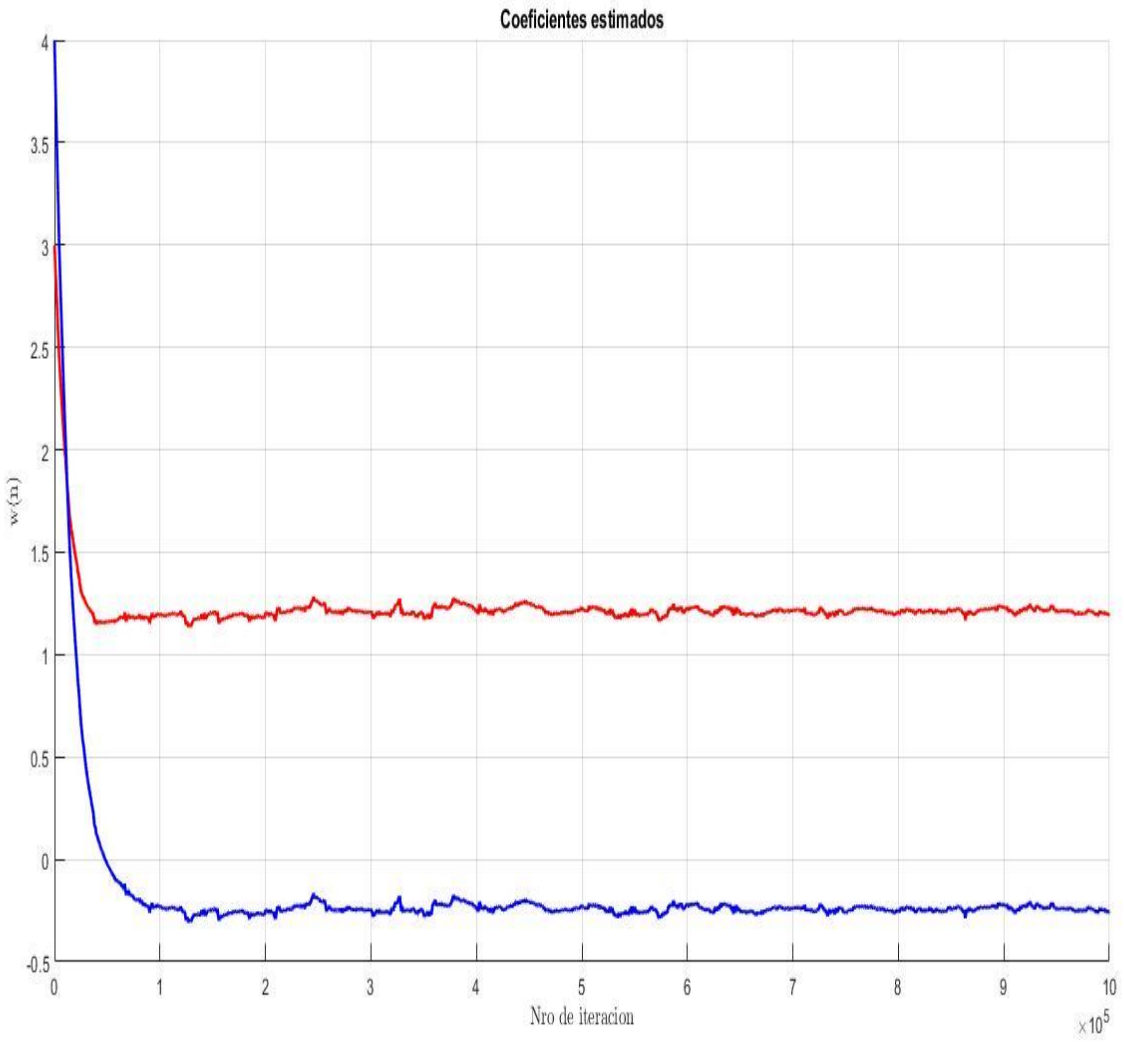
$$\mathbf{J} = \mathbf{E}[\,|x(n) - \hat{v}(n)|^2\,] = \mathbf{E}[x(n)x(n)^* - x(n)\hat{v}(n)^* - \hat{v}(n)x(n)^* + \hat{v}(n)\,\hat{v}(n)^*] =$$
$$\mathbf{E}[(s(n) + v(n))(s(n) + v(n))^* - (s(n) + v(n))\hat{v}(n)^* - \hat{v}(n)(s(n) + v(n))^* +$$
$$\hat{v}(n)\hat{v}(n)^*] =$$
$$\mathbf{E}[s(n)s(n)^* + v(n)v(n)^* - s(n)\hat{v}(n) - v(n)\hat{v}(n) - \hat{v}(n) * s(n) - \hat{v}(n)v(n)^* +$$
$$\hat{v}(n)\hat{v}(n)^*] =$$

$\hat{v}(n) = w(n)^*u(n)$ y $s(n)$ descorrelacionado con $u(n)$

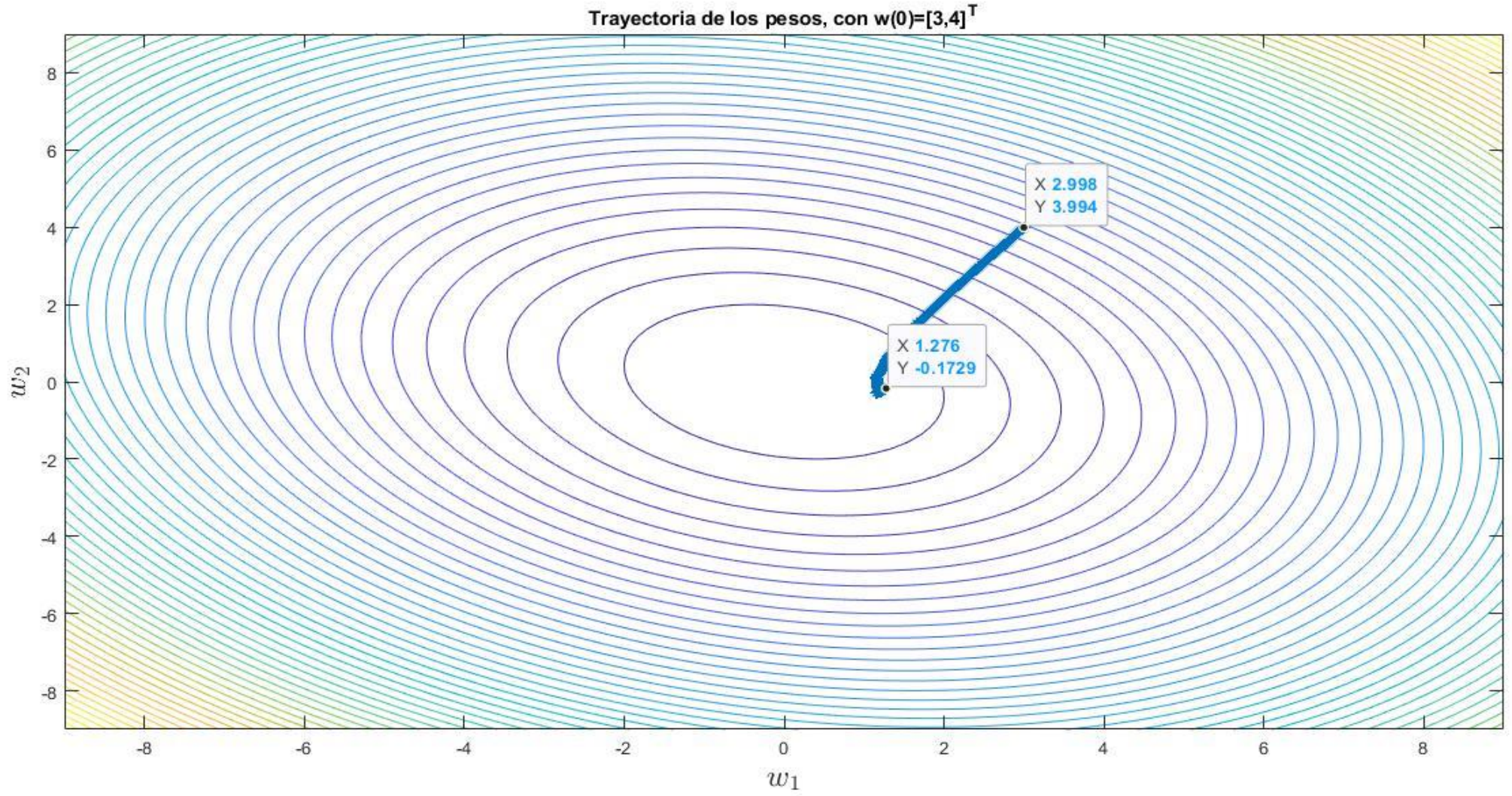
$$\mathbf{E}[s(n)s(n)^* + v(n)v(n)^* - \cancel{s(n)w(n)^*u(n) -} v(n)w(n)^*u(n) - \cancel{w(n)^*u(n) * s(n) -}$$
$$w(n)^*u(n)v(n)^* + w(n)^*u(n)\,(w(n)^*u(n))^*] =$$
$$\mathbf{E}[s(n)s(n)^* + v(n)v(n)^* - v(n)w(n)^*u(n) - w(n)^*u(n)v(n)^* + w(n)^*u(n)u(n)^*w(n)]$$
$$=$$
$$\boldsymbol{\mathbf{J} = \sigma_s^2 + \sigma_v^2 - R_{v,u}w(n) - w(n)^*R_{u,v} + w(n)^*R_u\,w(n) = \sigma_s^2 + \mathbf{V}}$$

- **Problema 2: Filtrado, $\mu = 0.5$, $M = 2, W(0) = [3,4]^T$**





• Problema 2


Trayectoria de los pesos, con w(0)=[3,4]^T
X 2.998
Y 3.994
X 1.276
Y -0.1729
w_2
w_1
8
6
4
2
0
-2
-4
-6
-8
-8
-6
-4
-2
0
2
4
6
8

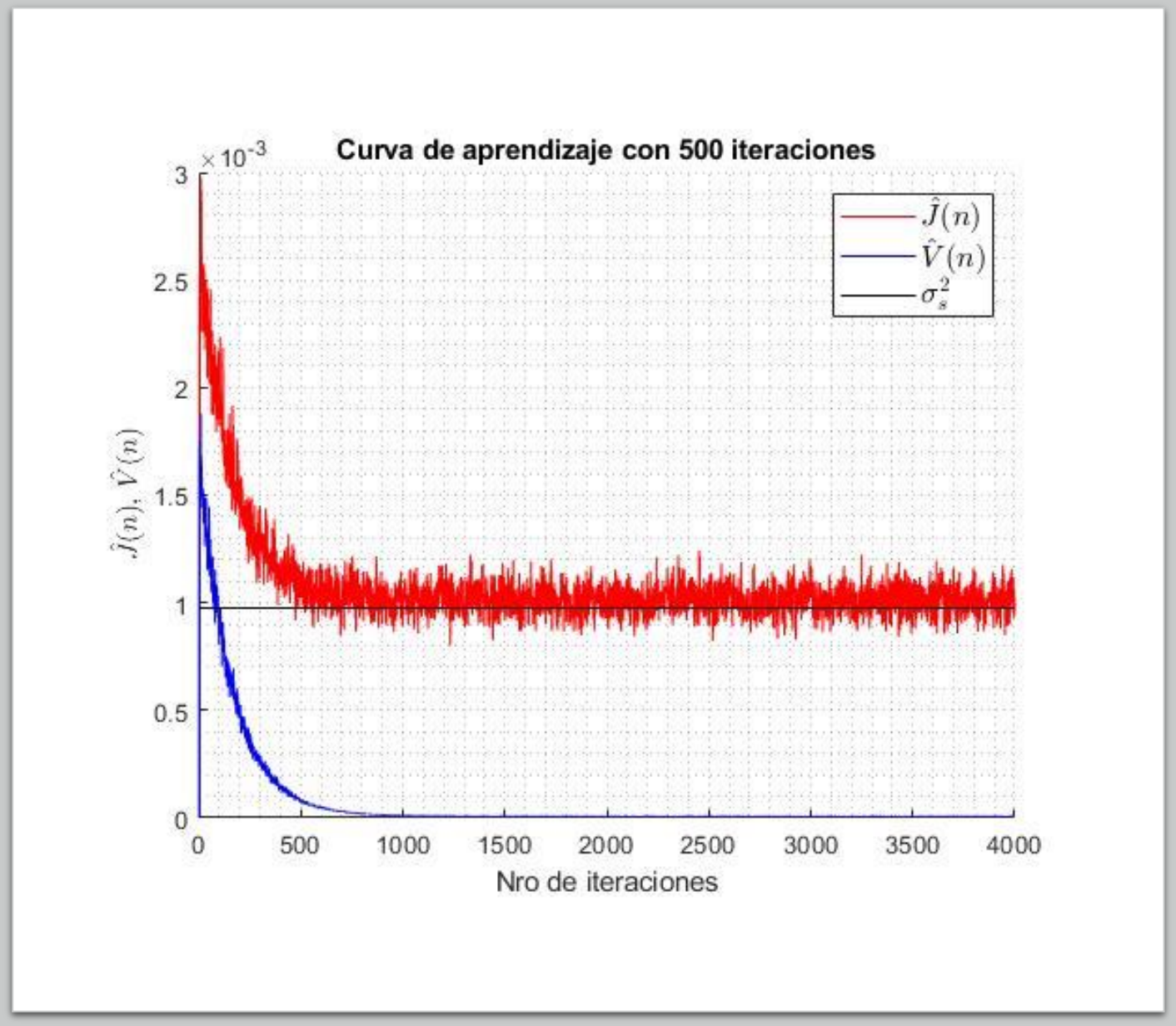
- **Problema 3**

$$SNR_{dB} = 10\log\left(\frac{\sigma_s^2}{\sigma_v^2}\right) = 10$$

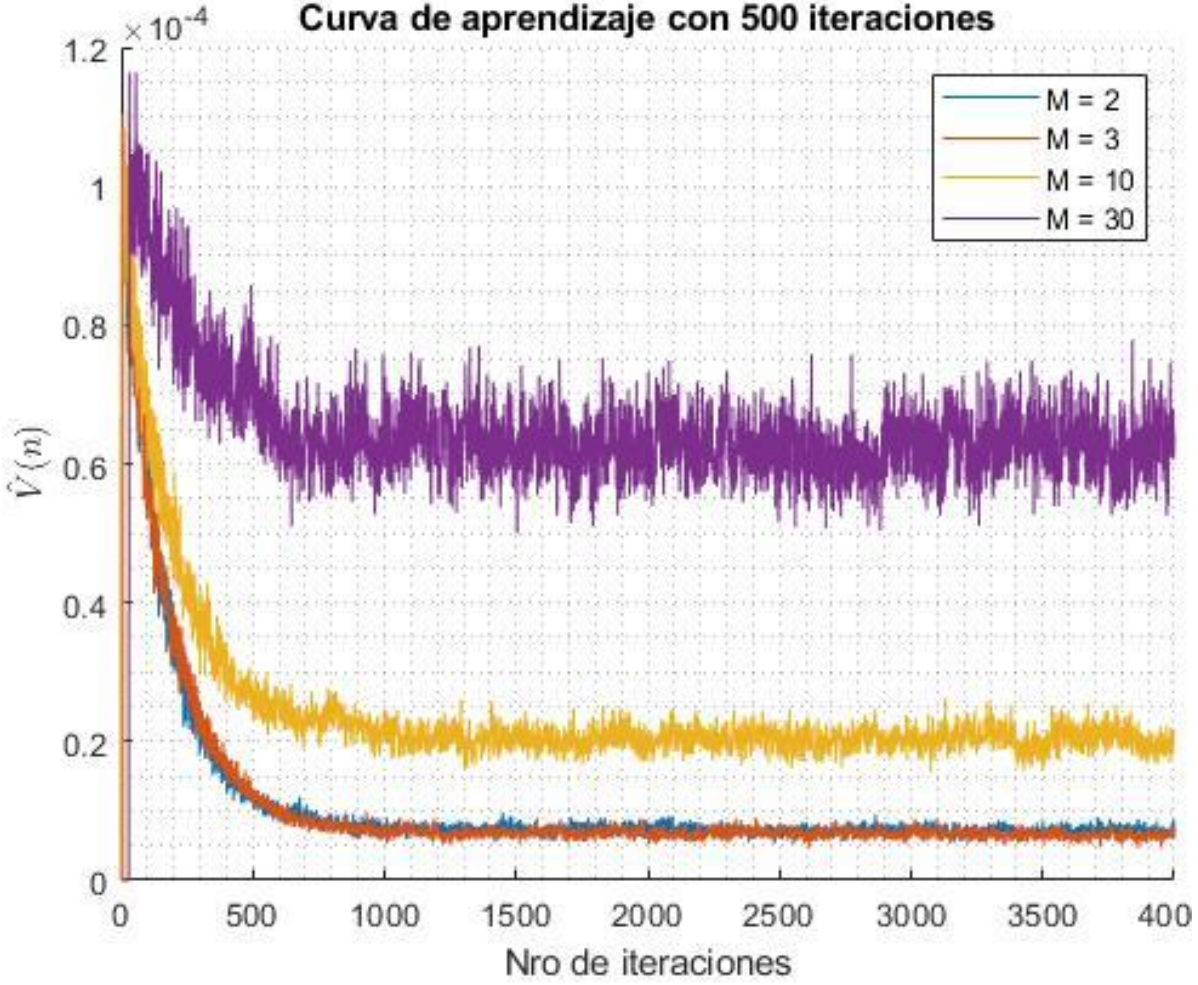
h = [0.8, 0.2, −0.01]

$$J = \sigma_s^2 + V$$

LMS: $\mu = 40, M = 2,$
$W(0) = [3,4]^T$

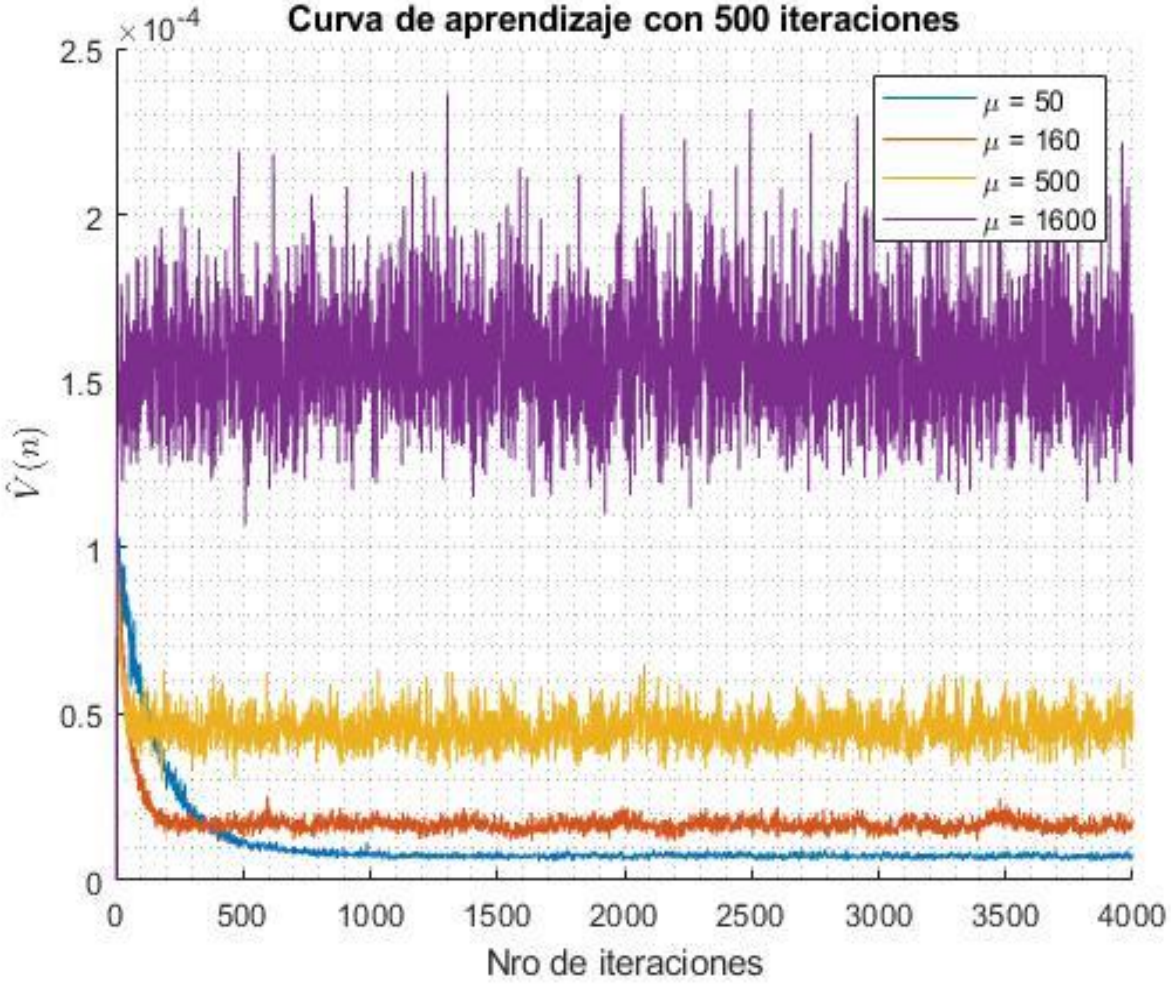


- **Problema 3**

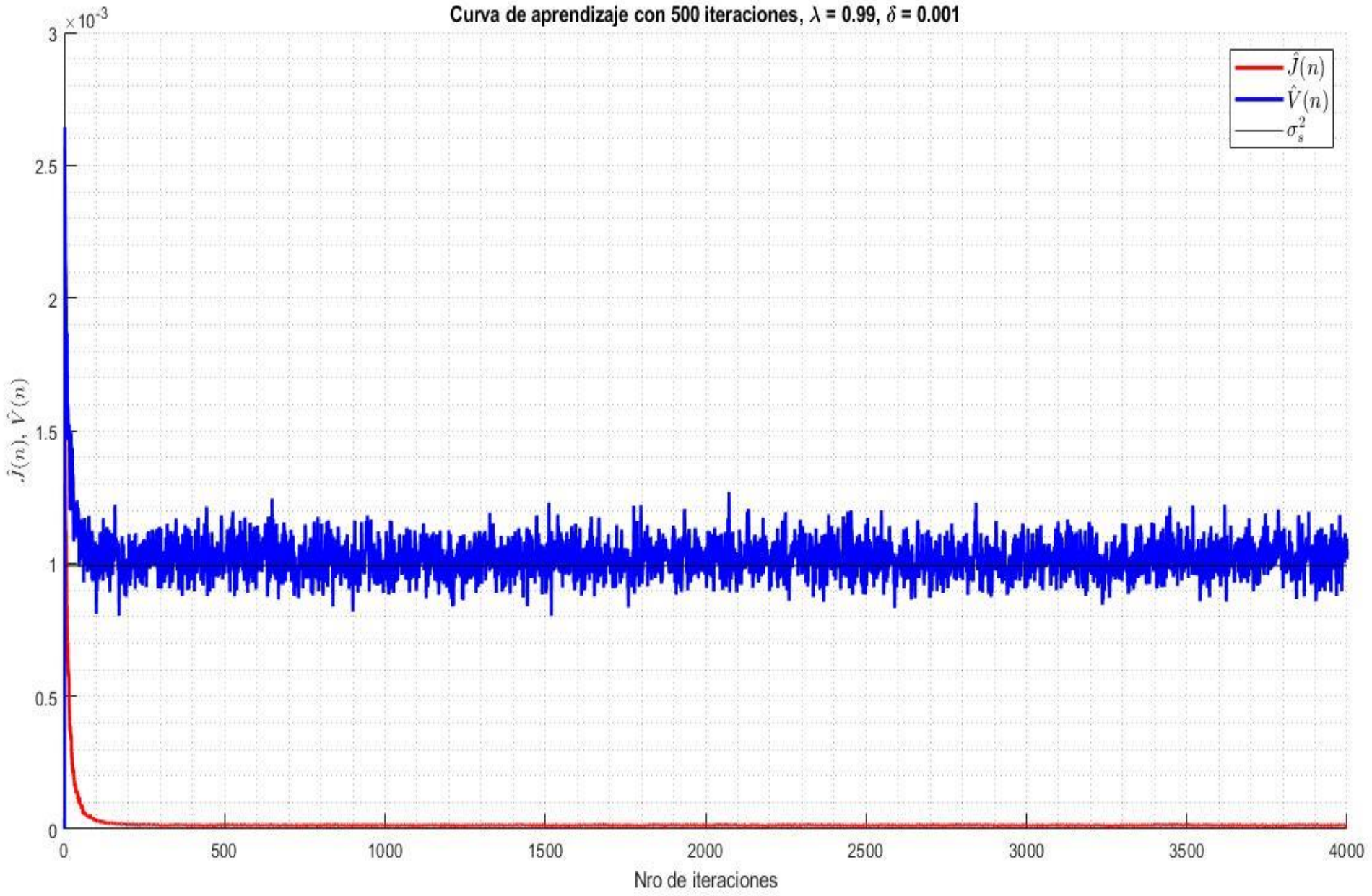


LMS : $\mu = 50$ parametrización con M
W(0) = 0

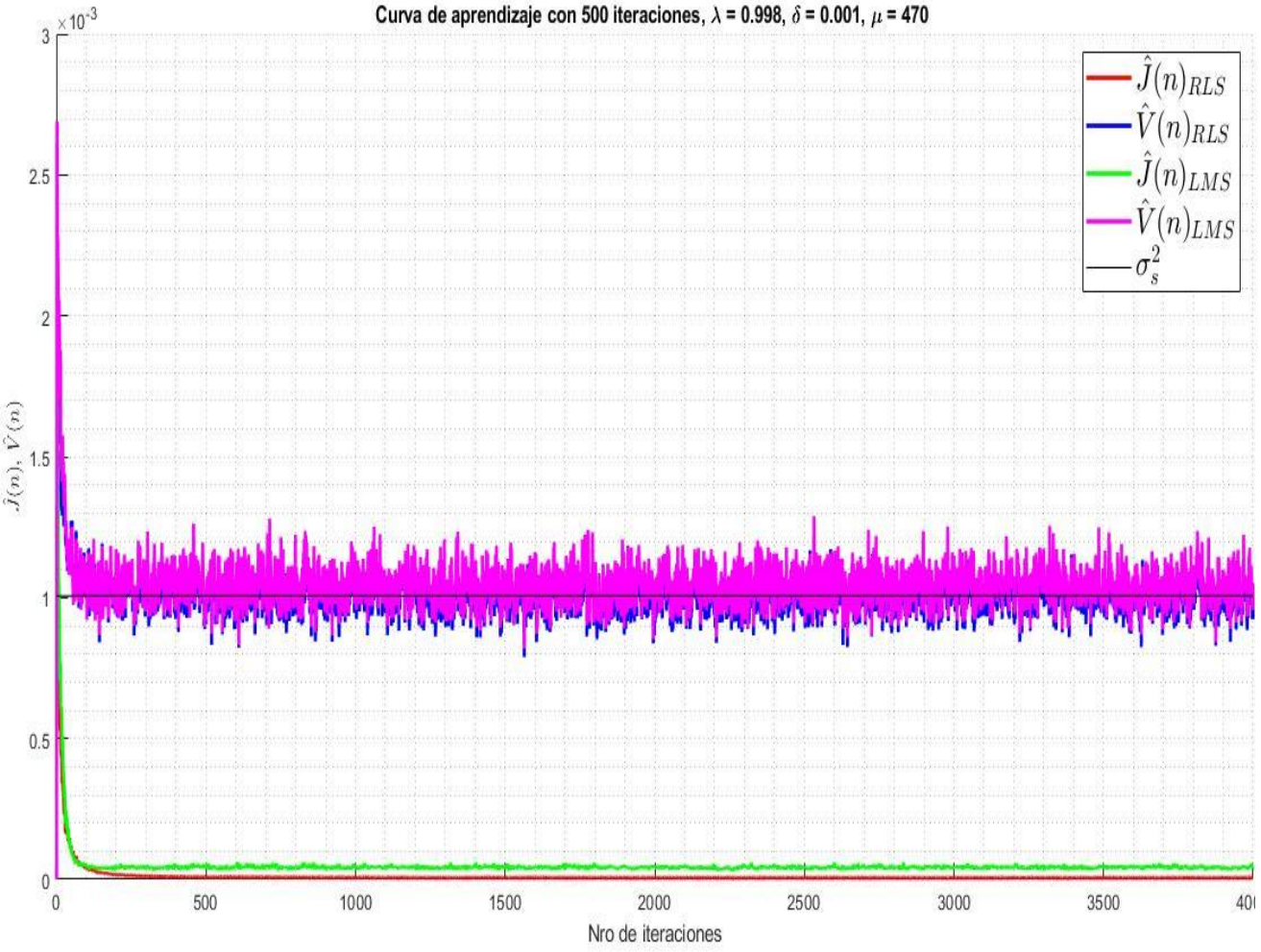
LMS : $M = 50$ parametrización con μ
W(0) = 0



- **Problema 4: RLS, M = 2, $W(0) = [3, 4]^T$**



• Problema 4



RLS y LMS : $\lambda = 0,998$. Modificando μ para tener la misma pendiente inicial de las potencial de error.

$$\mu = 470$$

RLS y LMS : $\lambda = 0,998$. Modificando μ para tener la potencias $\hat{\mathbf{v}}(\mathrm{n})$ en $n \to \infty$tiendan a lo mismo

$$\mu = 27$$