```
[Mu,MM3*100,JJZexdB]
J11=J1(1:LL);nn=0:LL-1;
plot(nn,10*log10(abs((JZ))));
```

Table 8.8.1 shows a summary of the LMS-type algorithms presented in this chapter.

Table 8.8.1 Summary of the LMS Algorithms Presented in Chapter 8

$\mathbf{x}(n)=[x(n)\,x(n-1)\cdots x(n-M)]^{\mathrm{T}}$, $\mathbf{w}(n)=[w_0(n)\,w_1(n)\;\cdots\;w_M(n)]^{\mathrm{T}}$, $e(n)=d(n)-y(n)$

Algorithm	**Recursion**
1. LMS	$\mathbf{w}(n+1)=\mathbf{w}(n)+2\mu e(n)\mathbf{x}(n)$
2. LMS with complex data	$\mathbf{w}(n+1)=\mathbf{w}(n)+2\mu e^{*}(n)\mathbf{x}(n)$ $y(n)=\mathbf{w}^{\mathrm{H}}(n)\mathbf{x}(n)$ (H = *conjugate transpose*)
3. Sign LMS	$\mathbf{w}(n+1)=\mathbf{w}(n)+2\mu sign(e(n))\mathbf{x}(n)$
4. Sign-regressor LMS	$\mathbf{w}(n+1)=\mathbf{w}(n)+2\mu e(n)sign(\mathbf{x}(n))$
5. Sign-sign LMS	$\mathbf{w}(n+1)=\mathbf{w}(n)+2\mu sign(e(n))sign(\mathbf{x}(n))$
6. Normalized LM	$\mathbf{w}(n+1)=\mathbf{w}(n)+\dfrac{1}{\mathbf{x}^{\mathrm{T}}(n)\mathbf{x}(n)}e(n)\mathbf{x}(n)$ *with* $\mu(n)=1/[2\mathbf{x}^{\mathrm{T}}(n)\mathbf{x}(n)]$
9a. ε-Normalized LMS	$\mathbf{w}(n+1)=\mathbf{w}(n)+\dfrac{\bar{\mu}}{\varepsilon+\mathbf{x}^{\mathrm{T}}(n)\mathbf{x}(n)}e(n)\mathbf{x}(n)$ $\bar{\mu}$ = step-size parameter ε = prevents division by very small number
9b. ε-Normalized LMS with complex data	$\mathbf{w}(n+1)=\mathbf{w}(n)+\dfrac{\bar{\mu}}{\varepsilon+\mathbf{x}^{\mathrm{H}}(n)\mathbf{x}(n)}e^{*}(n)\mathbf{x}(n)$ H = conjugate transpose
10. Normalized LMS sign algorithm	$\mathbf{w}(n+1)=\mathbf{w}(n)+2\mu\dfrac{sign(e(n))\mathbf{x}(n)}{\varepsilon+\lVert\mathbf{x}(n)\rVert^{2}}$
11. Leaky LMS	$\mathbf{w}(n+1)=(1-2\mu\gamma)\mathbf{w}(n)+2\mu e(n)\mathbf{x}(n)$ $0 << <1$
12. Constrained LMS	$\mathbf{w}(n+1)=\mathbf{w}'(n)+\dfrac{a-\mathbf{c}^{\mathrm{T}}\mathbf{w}'(n)}{\mathbf{c}^{\mathrm{T}}\mathbf{c}}\mathbf{c}$ $\mathbf{w}'(n)=\mathbf{w}(n)+2\mu e(n)\mathbf{x}(n)$ $\mathbf{c}$ = constant vector, a = constant
13. Self-correcting LMS	$y_{i+1}(n)=y_i(n)^{*}w_{i+1}$ see also the m-file in the text
14. Transform domain LMS	see Sec. 8.7
15. Self-correcting adaptive filtering (SCAF)	see Sec. 8.6
16. ENSS Algorithm	see Sec. 8.8
17. RVSS Algorithm	see Sec. 8.8
18. EDNSS Algorithm	see Sec. 8.8