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% Example of LMS algorithm
%
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%
len=5000;     % Segment length
SR=10000;     % Simulated sample rate
L=100;        % Length of adaptive filter
u=0.003;      % Adaptation rate parameter (0<u<1; typ u<<1)

% Simulated signal
sig = 50*sin(2*pi*400*(0:len)/SR);

% Simulated noise
nz = 200*cos(2*pi*60*(0:len)/SR);

% "Desired" signal into adaptive structure
d = sig + nz;

% Simulated correlated noise:  same frequency as nz, but different
%  amplitude and phase.
cnz = 10*sin(2*pi*60*(0:len)/SR + pi/5);
sigma2 = (10*10)/2;  % input variance for correlated noise

% Vector containing adaptive FIR filter weights (W(z))
wfilt = zeros(1,L);

% Update scale parameter
delt = 2*(u)/(L*sigma2);

outseq=0;
wseq=wfilt';
% Run simulation loop
for i=(1:(len-L))
    xvec= cnz(i:i+L-1);   % Input vector for this step
    y=sum(wfilt.*xvec);   % Calculated FIR zipper
    ev=d(i+L-1)-y;        % Output difference ("error") sample
    % Now update filter weights
    for j=(1:L)
        wfilt(j)=wfilt(j)+delt*ev*xvec(j);
    end
    outseq=[outseq ev];
    if(mod(i,10)==0)
        wseq=[wseq, wfilt'];
    end
end
```