```
Fm=5;
Fc=300;
Fs=5000;
t=0:1/Fs:1;
Am=1;
Ac=1;
m=Am*sin(2*pi*Fm*t);
r1=Ac*square(2*pi*Fc*t);
r=(r1+1)/2;
pam=m.*r;
[b,a]=butter(3,2*Fm/Fs,'low');
k=2*filter(b,a,pam);
subplot(4,1,1);
plot(t,m);
title('Message Signal');
xlabel('time');
ylabel('amplitude');
subplot(4,1,2);
plot(t(1:500),r(1:500));
ylim([-0.5 1.5]);
title('Reference Signal');
xlabel('time');
ylabel('amplitude');
subplot(4,1,3);
plot(t(1:2500),pam(1:2500));
ylim([-2 2]);
title('Modulated Signal');
xlabel('time');
ylabel('amplitude');
subplot(4,1,4);
plot(t,k);
title('Demodulated Signal');
xlabel('time');
ylabel('amplitude');
```

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