

### Problem Set 3 – Time Machine

Execute this code in MATLAB:

```
clear all
w = 0:5*pi/32:20*pi-5*pi/32;
Fh = cos(w) + i * sin(w);
fvals = -64:63;
plot(fvals,real(Fh));
hold all
plot(fvals,imag(Fh));

waitforbuttonpress;

signal = [zeros(1,55),0.1:0.2:1,1:-0.1:0.2,ones(1,5),-
1*ones(1,10),zeros(1,44)];
Fsignal = fft(signal);
FhFsignal = Fsignal .* Fh;
subplot(2,1,1)
area(signal)
text(2,0.8,'Original Signal')
subplot(2,1,2)
area(real(ifft(FhFsignal)))
text(2,0.8,'Signal after Fourier multiplication');
```

Explain your result. Hint: This problem set is about the convolution theorem.