

Pop Quiz (Week 3) – 11 pts [11 minutes]

Name: _____

Student ID: _____

1. **[3]** Let us consider a signal $x(t)$. Consider the operation $\frac{1}{2}(x(t)*\delta(t) + x(t)*\delta(t-1))$. This is equivalent to

- ☒ low pass filtering of x
- ☐ high pass filtering of x
- ☐ band pass filtering of x

2. **[1]** Laplacian pyramid provides

- ☐ low pass filtering
- ☐ high pass filtering
- ☒ band pass filtering

3. **[2]** Why are we usually only concerned about the magnitude plot in frequency domain and not the phase?

Phase information is better studied in the spatial domain since the synchronicity of phase of one wave with respect to other is better captured in spatial domain.

4. **[1]** If we widen the support of a filter in the spatial domain, its frequency domain response

- ☐ Expands
- ☒ Shrinks
- ☐ Remains the same

5. **[1]** As we go down the Gaussian pyramid, the sampling requirement

- ☐ Increases
- ☒ Decreases
- ☐ Remains the same

6. **[2+1]** Consider a 1D filter given by $\delta(t)+l(t)$ where $l(t)$ is a three pixel box filter. Draw this filter. Does this retain the energy of a signal during convolution?

In matlab notation, the filter is $[1/3, 4/3, 1/3]$. The energy is not preserved since the values don't add up to one.