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ECE251 Assignment 6 explanation

1. For the symbol values I chose 45,135,225 and 315 degrees. This is because I was having trouble figuring out how to parse samples that fell about the 0/2\*pi divide when using 0,90,180,270 encoding. It worked out to be simpler using the 45-degree coding.
2. –
3. –
4. –
5. –
6. –
7. –
8. The detection scheme is simply finding the phase of each sample and taking the difference from the current sample phase to the previous sample phase. This produces the differential phase ‘sample’ which can then be mapped to the nearest differential symbol value.
9. An extra 1 had to be taken away from ‘a‘ because we lose an additional symbol from the fact that the first value is a ‘setup’ value for the phase differential.
10. –
11. For delta f = 0,1 and 10, there is slightly less than a 3dB shift in the curve from theoretical 4QAM SER to simulated differential SER which is the expected SNR loss. For delta f = 100, the simulated values deviate extremely from the theoretical, confirming the inability of the differential encoding scheme to correct for anything but small frequency offsets.