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| C:\Users\Jared\AppData\Local\Microsoft\Windows\INetCache\Content.Word\BPSK.PNG  The theoretical and simulated match pretty well. Hypothetically the longer you simulate the more accurately they match. Theoretical bounds are very useful when the probability error is extremely small. This is due to the fact that he smaller the probability of error the longer the simulation takes(time grows exponentially with respect to SNR in db). Some simulations are just unfeasible. The smaller the p0 the smaller the probability of error. This makes since. If p0 = .000001 you could get really low probability of error just by always guessing 1. This is ineffective though because there is less information. | C:\Users\Jared\AppData\Local\Microsoft\Windows\INetCache\Content.Word\psk8.pngThe higher the signal to noise ration the longer the simulation took to run, the more accuracy desired the longer the simulation took to run. The theoretical bound matches the simulation very well in almost all cases. The one place the bound deviates from the simulation is in bit error at low signal to noise ratio. This makes since the bound in the book assumed bit error and symbol error to be the same since we used gray encoding. This assumption falls apart at low SNR since the noise is large enough to skip over neighboring symbols resulting in 2 bit flops instead of 1. |
| C:\Users\Jared\AppData\Local\Microsoft\Windows\INetCache\Content.Word\Hamming47.png  (7,4) hamming at 1E-5 probability of error the hamming code results in about .5 db gain over no error correction. This is about a factor of 12% improvement | C:\Users\Jared\AppData\Local\Microsoft\Windows\INetCache\Content.Word\Hamming1115.png(15,11) hamming at 1E-5 probability of error the hamming code results in about 1.1 db gain over no error correction. This is about a factor of 29% improvement |