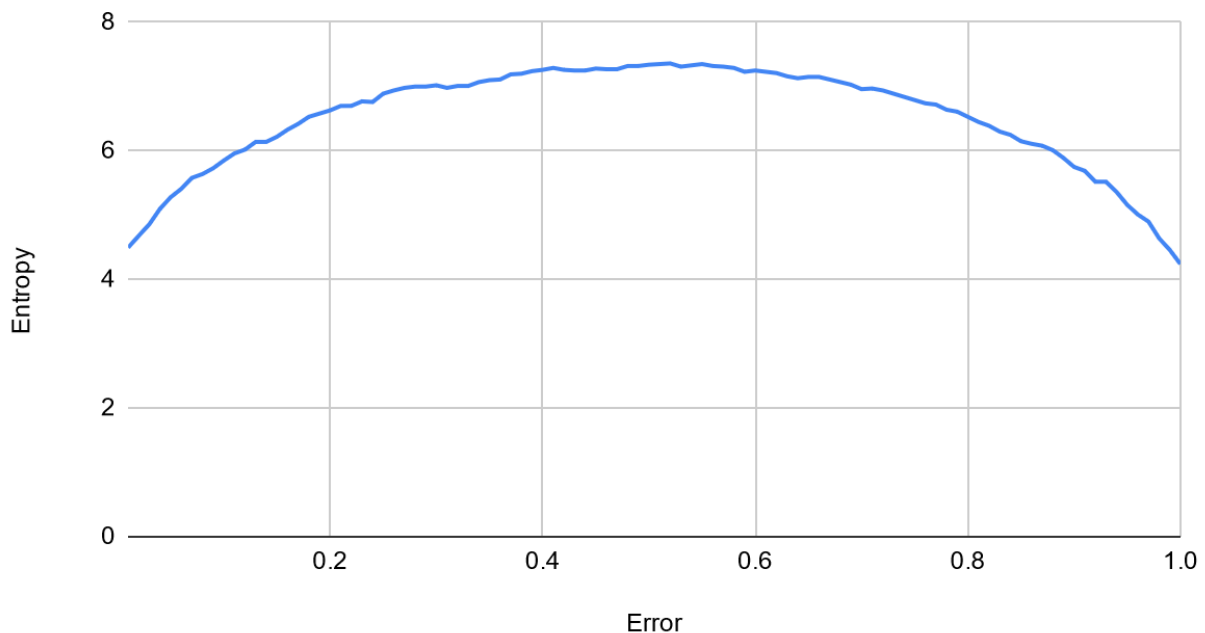
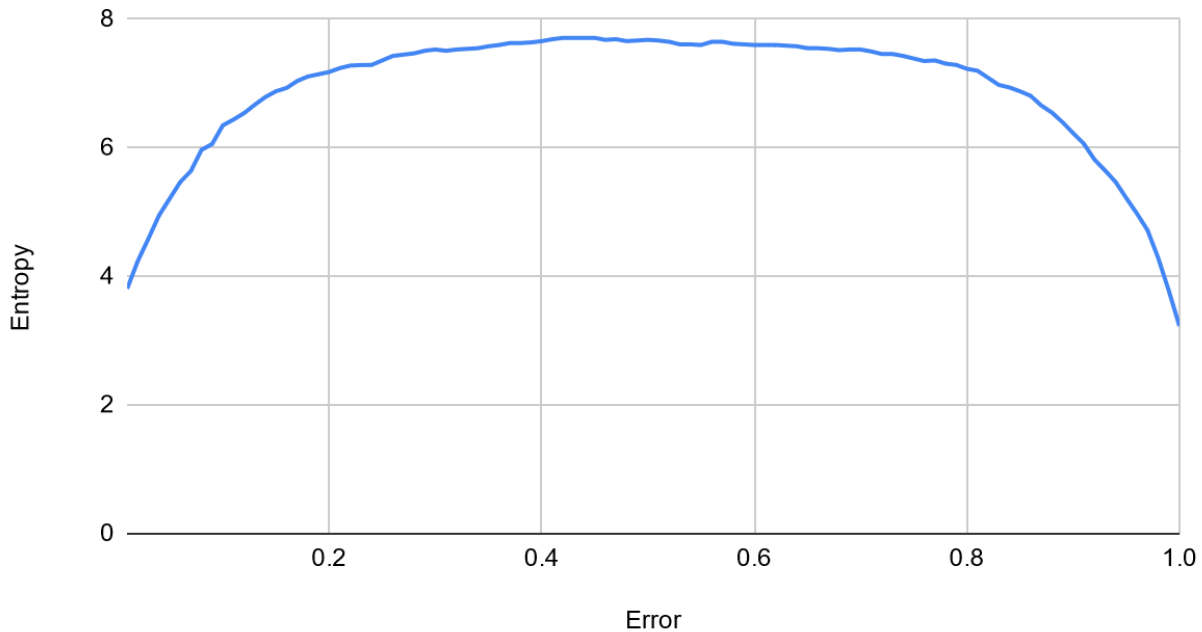


Entropy vs. Error Before



This is the entropy of a txt file before being encoded in hamming (8,4) over error rate from 0.01 to 1. You can see how it is like a bell it goes up before coming back down again to around the same level of entropy it was at before. The small inconsistencies can be easily explained away by the randomness of the error program, across .65 to .66 one is bound to produce more errors and .66 is more likely but not that much likely to produce more. The bigger question is why does entropy and therefore uncertainty go up near 50 percent error rate but go back down to regular rates when you come near 100 percent error rate. I do not know for certain, but I think it has to do with the fact that at 0 there is almost no uncertainty about what the bits are, but as you increase the error rate that uncertainty increases and the entropy increases as well, but at 100 percent entropy you are also pretty certain about what the data is, randomness, and as you lower the error rate you become less certain that the data is random as it could very well be a message. You end up with a situation where you are sure at the polar ends but unsure at the middle.

Entropy vs. Error After



This is the entropy of a txt file before being encoded in hamming (8,4) over error rate from 0.01 to 1. It is also a bell shape and follows a similar pattern as the previous graph, but this one has a distinction, the edges of the graph dip much faster than the before graph, meaning that there is more uncertainty faster with the hamming encoded file than the non hamming encoded file. I think there are two reasons for this, one the hamming encoded file is larger so there is more potential for uncertainty and the other reason is that the hamming encoded file the parity bits are dependent on the other bits in the byte. So if error comes in and starts swapping the bits in a byte not only is there uncertainty in the bits that were flipped themselves, but in the parity bits as well, explaining why the entropy of encoded hamming goes up faster than non encoded txt file.