Digital Communication – CA#2

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The generated raised cosine pulses for B= 0, 0.5, 1; with (0, 0.1T, 0.2T) sampling errors are shown below:

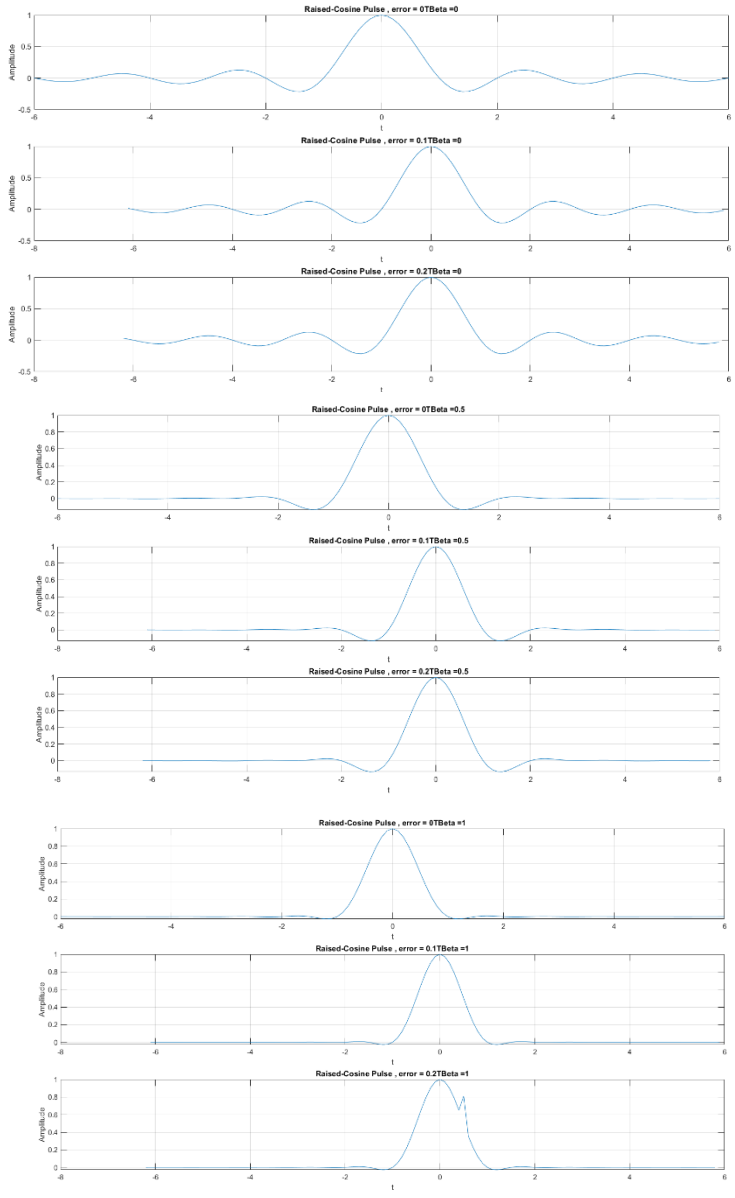

Figure 2.1: Raised-Cosine pulses with B = 0, 0.5, 1 and different sampling errors

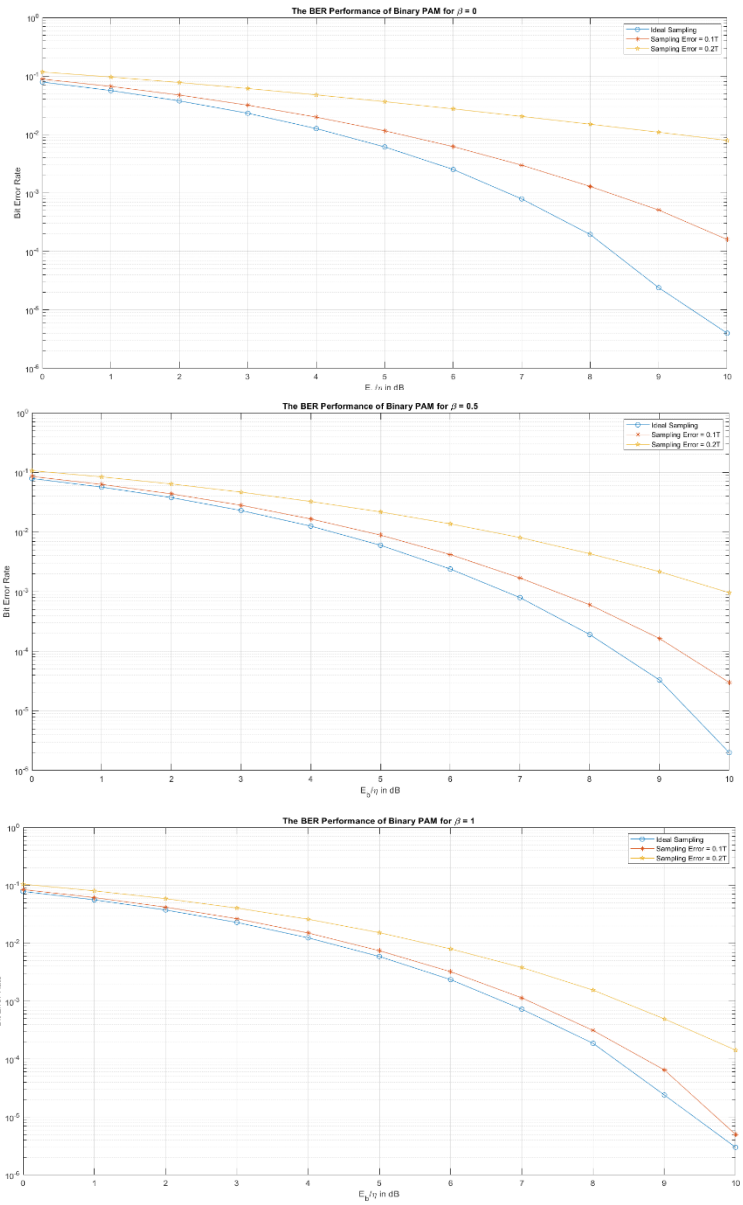

Figure 2.2: Error probability in received signal B = 0, 0.5, 1 and different sampling errors

As we can see the pulse that has 0.1T sampling error is generated in the [-6.1, 5.9] interval and the pulse with 0.2T sapling error rate is generated within the [-6.2, 5.8] interval. We can also see the ripples are larger for smaller Roll-off factors (β).

The most important conclusion we make form this assignment is that Error probabilities are higher for smaller Roll-off factors, cause the sensitivity of the raised-cosine pulse to ISI caused by jitter (sampling error) is smaller as the amount of change in the folded spectrum of pulses with higher Roll-off factors are smaller.

Furthermore, we observe that there's a trade-off between using BW and pulse resistance to ISI, this is why most Communication system use a medium Beta such as 0.35.

Thus the best Roll-off factor to choose in our case is $\beta = 0.5$.