

From Figure ?? several observations can be made. First, the error magnitude decreases exponentially with longer chain lengths, because timing violation firstly affects LSDs with online arithmetic. Second, interestingly we see that chains with longer delay would happen with greater probabilities in an OM. This is because for the unrolled radix-2 OM, $d(\tau)$ is only dependent upon the inputs for chain generation. Thus long chain will be generated as long as both input digits are not zeros with the probability of $4/9$. Compared to the traditional arithmetic, carry generation, propagation and annihilation are all decided by specific input patterns. This limits the overall probability of long chains. However, we also notice that for chains with long delays, the increasing in likelihood of error is outweighed by the decrease in magnitude of error. Therefore the combination of both results in a decline in error expectation. In contrast, one would expect error expectation to grow faster as the amount of overclocking is increased when using traditional arithmetic because errors occur in MSBs.