Design of a 1/3-rate Convolutional Encoder

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The block diagram of the encoder

With code rate $r = 1/3$ and constraint length $K = 3$, a block diagram depicting a 1/3-rate convolutional encoder design is shown in the figure below.
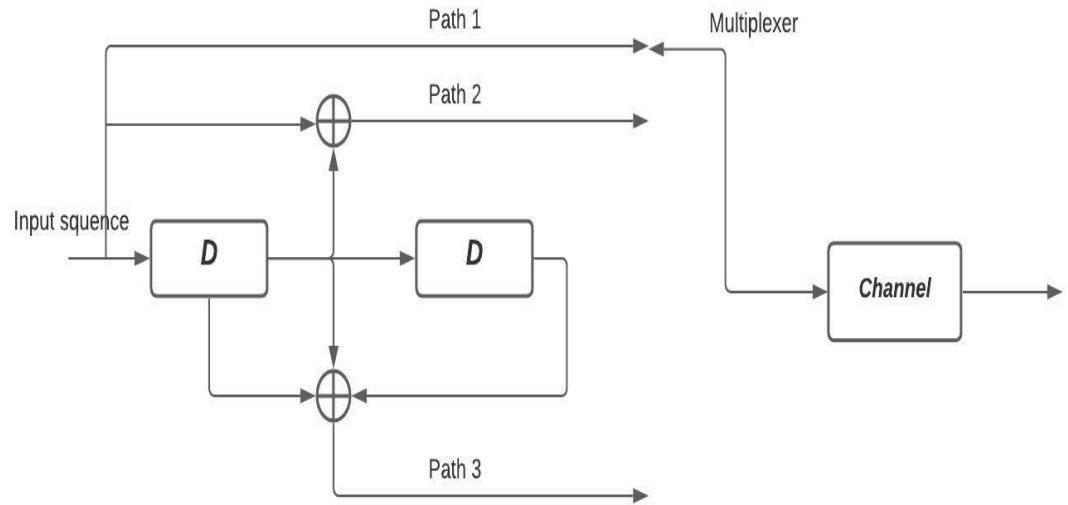

Figure 1: A block diagram of the convolutional encoder (Using Lucidchart)

From the block diagram shown above the D-domain generator functions for path *1*, path *2* and path *3* denoted as $G_1(D)$, $G_2(D)$ and $G_3(D)$, respectively, can be concluded as follows:

$$G_1(D) = 1$$

$$G_2(D) = 1 + D$$

$$G_3(D) = 1 + D + D^2$$