

7 FFs · 2⁷ states

All zero state - self sustaining

Maximal length sequence generator

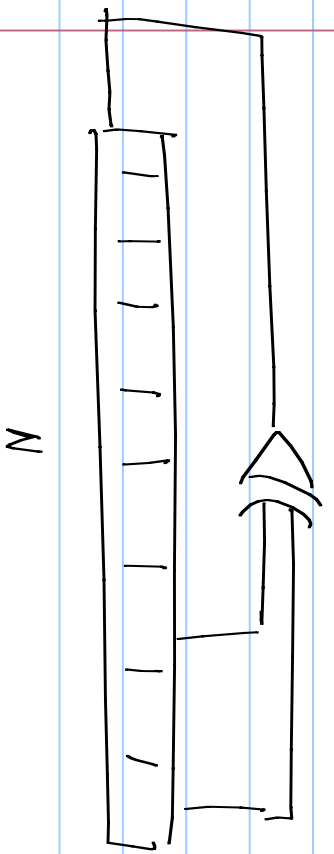
- All states of a 7 FF state machine except all zeros.

PRBS - Pseudo random bit sequence.

Initialized to any other state - Goes

through 2⁷-1 states & repeats.

Period = 127



Period of 2^N-1

PRBS-N sequence.

Sequence of period 127 $x[n]$ -1, 1

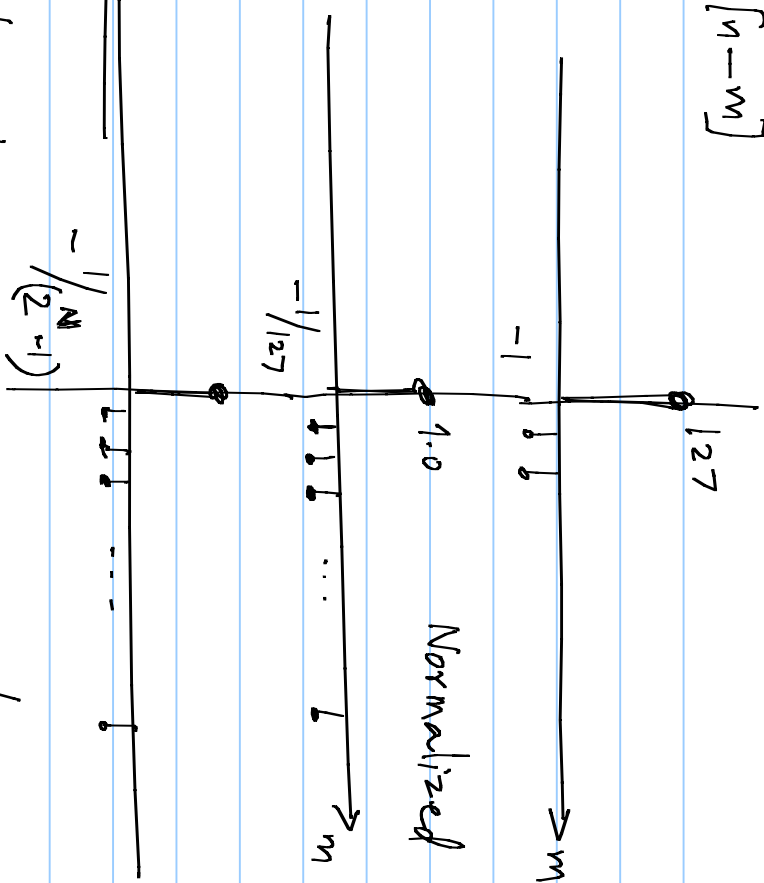
$$R_{xx}[m] = \sum_{n=0}^{126} x[n] \cdot x[n-m]$$

$$R_{xx}[0] = 127$$

$$R_{xx}[m] = -1 \quad m \neq 0$$

PRBS 7, 15, 23, 31

PRBS 31. $\approx 10^9$

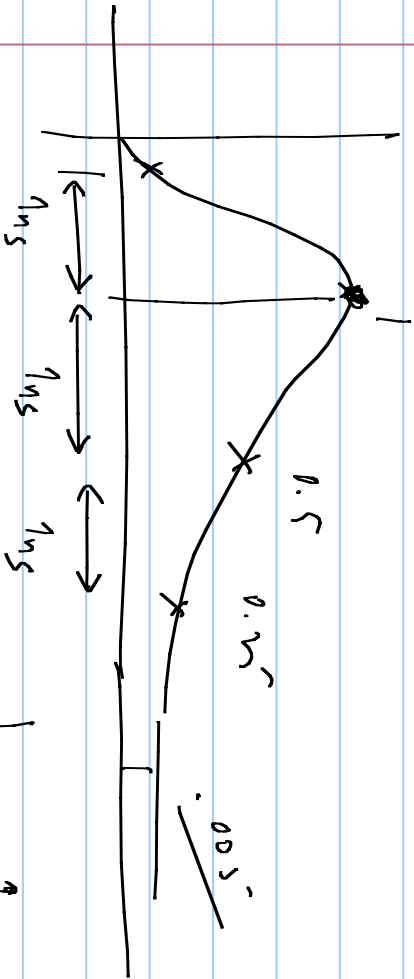


PRBS-N generator

- Shift register of length = N
 - XOR of the last $\frac{N}{p}$ & others is fed to the first.
 - Feedback taps are $\{N, n_1, n_2, n_3\}$
 $\{N, N-n_1, N-n_2, N-n_3\}$
- $N = 2^k$

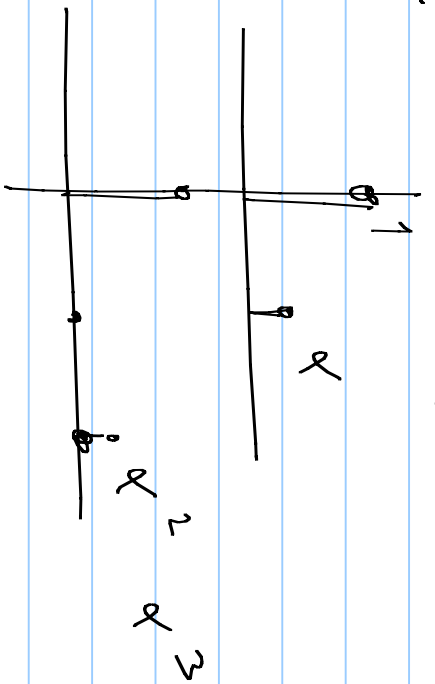
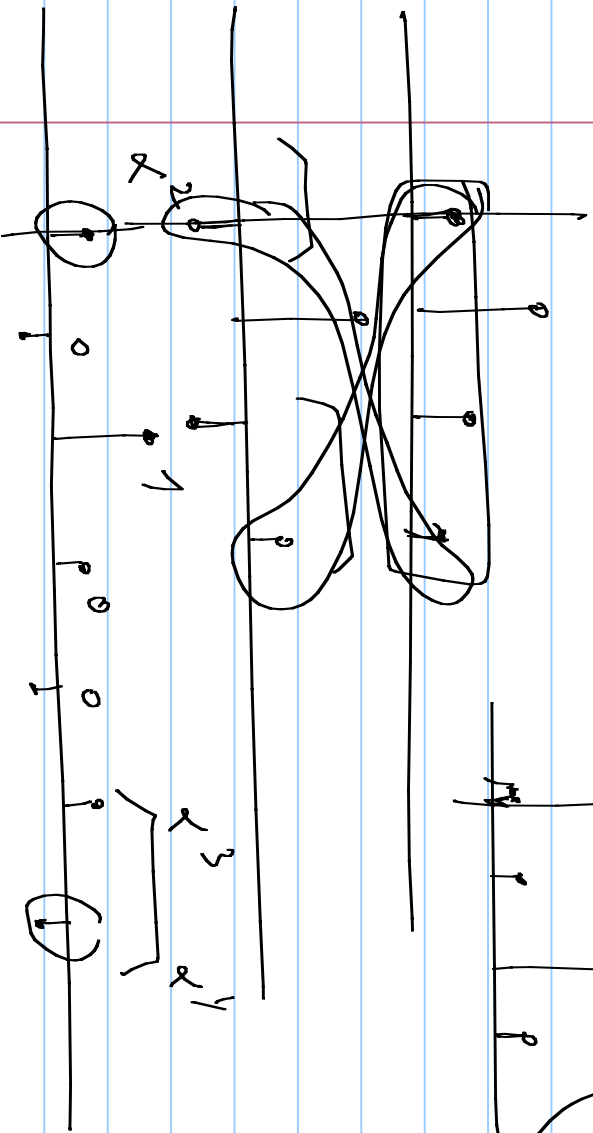
$$\frac{1}{(1 + s/w_p)^8}$$

5% eye opening: $w_p = 2\pi \cdot 1 \text{ Grad/s}$
 10% 1 GHz



$w_p = 4 \text{ Grad/s}$

CURSOR f 2
 CURSOR f 3



$x_1 \ y_1$
 $x_2 \ y_2$
 $\vdots \ \vdots$

$x_{10} \ y_{10}$

$$y = \sum_m x + c \longrightarrow$$

$$\begin{bmatrix} x_1 & 1 \\ x_2 & 1 \\ x_3 & 1 \\ \vdots & \vdots \\ x_{10} & 1 \end{bmatrix} \begin{bmatrix} c \\ c \\ c \\ \vdots \\ c \end{bmatrix} = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_{10} \end{bmatrix}$$

$$A^T A \begin{bmatrix} m \\ c \end{bmatrix} = A^T y$$

$$\begin{bmatrix} m \\ c \end{bmatrix} = (A^T A)^{-1} A^T y$$

delay
2. transform

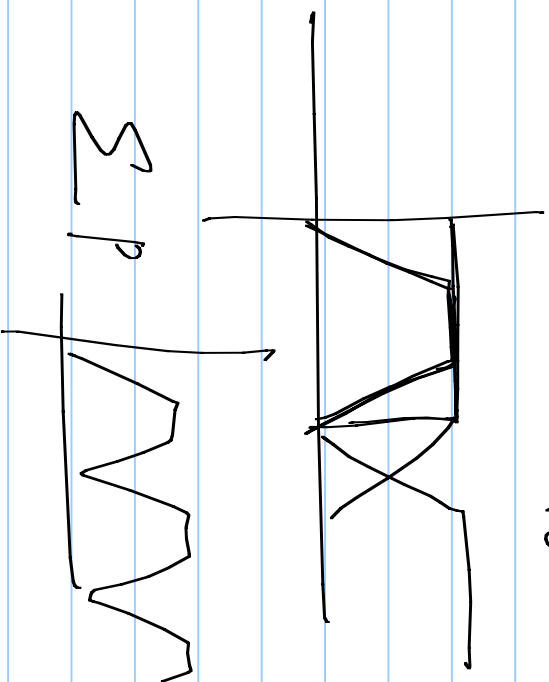
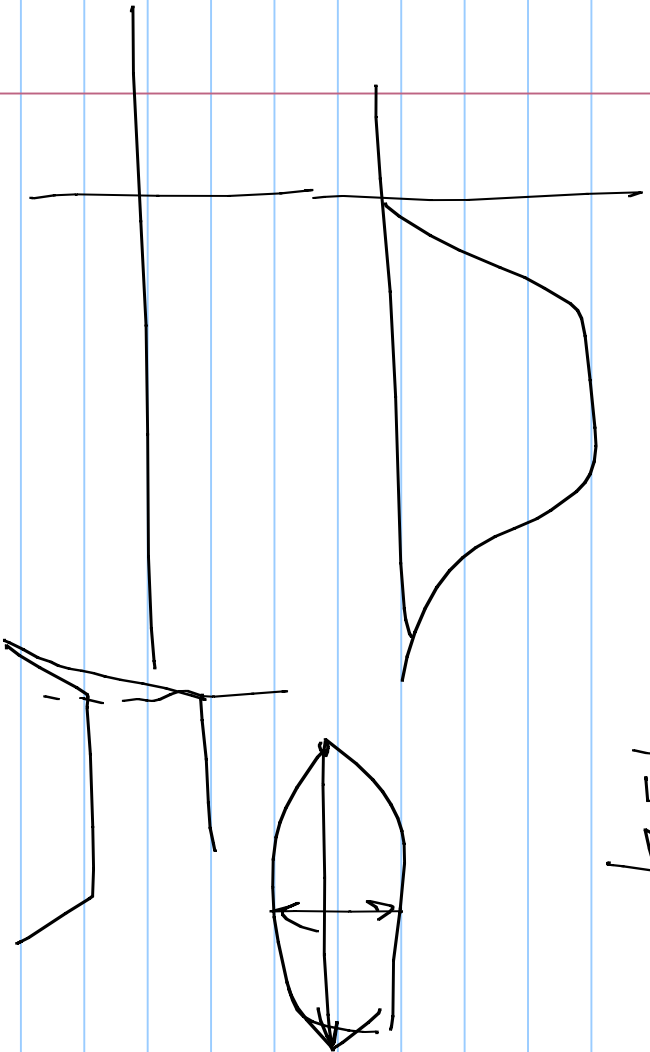
Laplace - nd

$$\int x \cdot y \cdot dt$$

$z^i - nd$

$z^i - zp$

$$\underbrace{\sum x_s y_s}_{10^{-9}} \cdot T_s$$



z^p