

Sync and delimiter patterns for 25GEPON

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Patterns from 802.3av

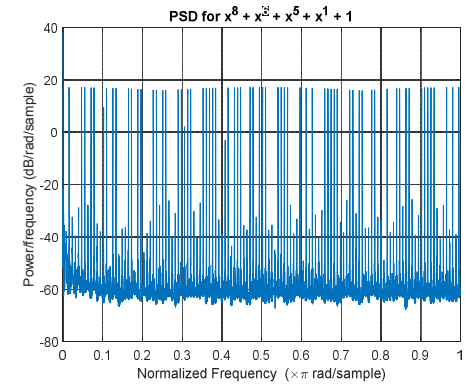
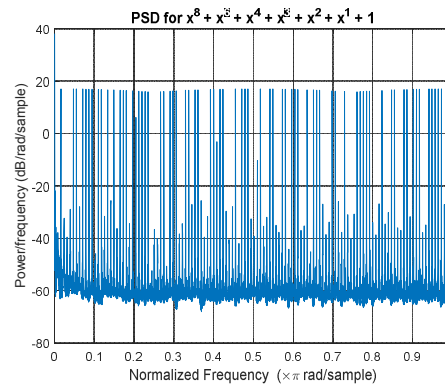
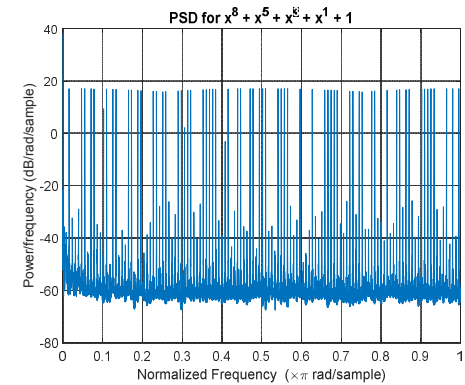
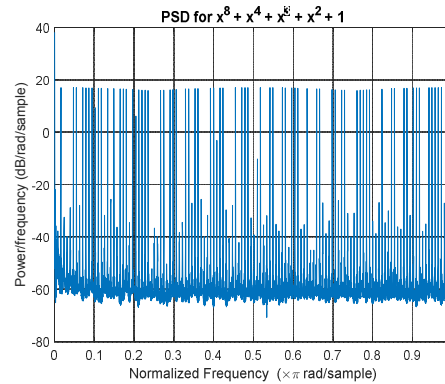
- Sync and Delimiter patterns were 66bits
 - This number is small enough to enable exhaustive searching of the entire code space
- Sync pattern was selected to be
 - DC balanced
 - Flat PSD spectrum
- Delimiter pattern was selected to be
 - DC balanced
 - Good correlation properties against shifted versions of the sync pattern and itself

What's new in 25GEPON

- It seems the line code will be 256b257b
- It would be advantageous to find new patterns of length ~ 257
 - However, exhaustive search won't work (space is just too big)
- Fortunately, mathematics to the rescue
 - Pseudorandom sequences (primitive polynomials) have just the properties we are looking for

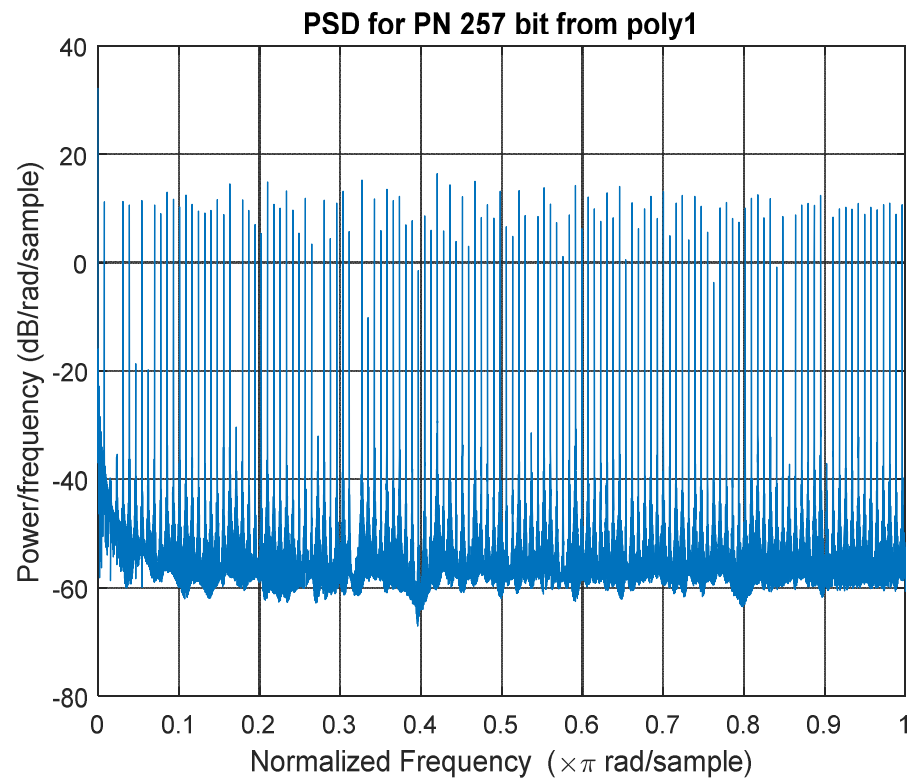
Spectra of PN(255)

- $x^8 + x^4 + x^3 + x^2 + 1$
- $x^8 + x^5 + x^3 + x^1 + 1$
- $x^8 + x^6 + x^4 + x^3 + x^2 + x^1 + 1$
- $x^8 + x^6 + x^5 + x^1 + 1$
- $x^8 + x^6 + x^5 + x^2 + 1$
- $x^8 + x^6 + x^5 + x^3 + 1$
- $x^8 + x^7 + x^6 + x^1 + 1$
- $x^8 + x^7 + x^6 + x^5 + x^2 + x^1 + 1$



But we want 257 bits...

- If we pad the 255 bits to 257 with 10, we get a spectrum that is still almost flat

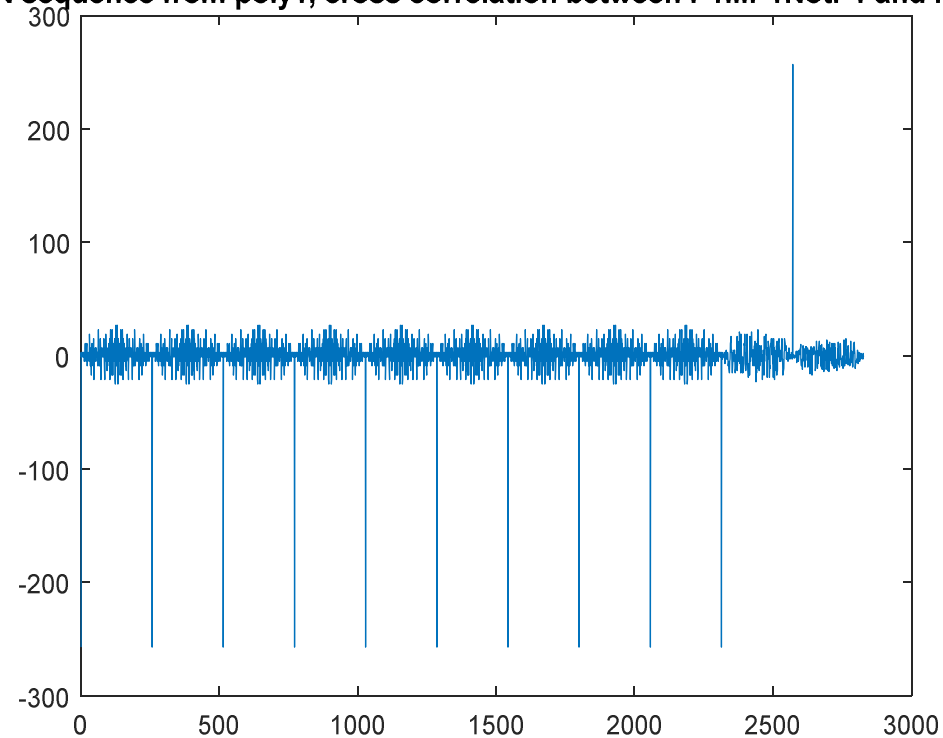


- Further optimization may be possible

Sync and Delimiter

- Simplest arrangement: $P1, P1, \dots, P1, \overline{P1}$
 - Delimiter searching for $\overline{P1}$

PN sequence from poly1, cross correlation between P1...P1NotP1 and NotP1



Conclusions

- Whatever line code we choose, we should search for a PN-like pattern of that length
 - E.G., for 256b257b, start from a PN(255) code and add two more bits (to be optimized)
- Sync pattern is repeat of that pattern
- Delimiter is inverse of that pattern
 - Has the advantage that it provides single correlator receiver with block sync before the delimiter