MQAM system

October 14, 2016

The MQAM system has four components: a transmitter designated MQAM transmitter, a communication channel and two sinks.

The MQAM transmiter generates two output signals: an optical and a binary signal. The optical signal is transmitted through the communication channel to one of the sinks that works as a receptor and is designated MQAM receptor. The binary signal is used in the other sink to measure the Bit Error Rate (BER). This transmitter doesn't accept any input signal.

MQAM transmitter

The MQAM transmitter has seven blocks:

- Binary Source (B1)
- MQAM Mapper (B2)
- Discrete to Continuous (B3, B4)
- Pulse Shaper (B5, B6)
- IQ Modulator (B7)

Each of the Bi (i=1,...,7) blocks represents a block of code that executes a specific task. A detailed description of these blocks can be found in the *lib* repository. Figure 1 represents the transmitter in a schematic manner.

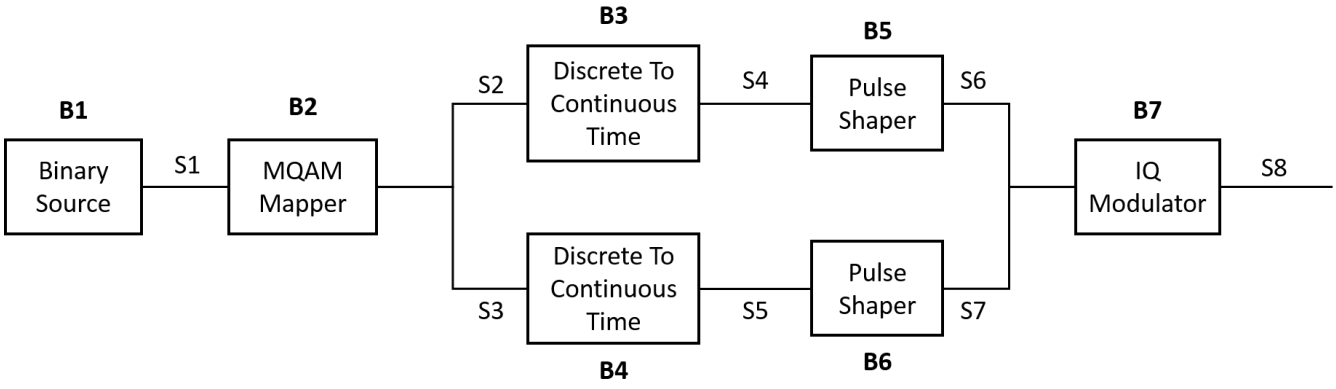

Figure 1: MQAM transmitter block diagram

Functional description

The MQAM transmitter produces two output signals: an optical and a binary signal.

The optical signal can be scalar or have two polarization components along two perpendicular axis. To generate the optical signal it starts with a binary signal generated by the *binary source*. This signal is then mapped in the IQ space by the *MQAM mapper* block producing two signals: one in phase and one in quadrature. Each one of these signals is converted into a continuous signal in the time domain by the *DiscreteToContinuous* blocks and then filterd in the *Pulse Shaper* block. Lastly the *IQ modulator* blocks recombines the two signals in order to produce a complex optical signal.

The binary signal is extracted directly froom the *binary source* block.

Communication channel

The communication channel has only thermal noise.

MQAM receptor

BER measurement