IQ Modulator

November 11, 2016

This blocks accepts one inupt signal continuous in both time and amplitude and it can produce either one or two output signals. It generates an optical signal and it can also generate a binary signal.

Input Parameters

- outputOpticalPower{1e-3}
  (double)
- outputOpticalWavelength{1550e-9}
  (double)
- outputOpticalFrequency{speed_of_light/outputOpticalWavelength}
  (double)

Methods

IqModulator(vector<Signal *> &InputSig, vector<Signal *> &OutputSig) :Block(InputSig, OutputSig){};

void initialize(void);

bool runBlock(void);

void setOutputOpticalPower(double outOpticalPower) { outputOpticalPower = outOpticalPower; }

void setOutputOpticalPower_dBm(double outOpticalPower_dBm) { outputOpticalPower = 1e-3*pow(10, outOpticalPower_dBm / 10); }

void setOutputOpticalWavelength(double outOpticalWavelength) { outputOpticalWavelength = outOpticalWavelength; outputOpticalFrequency = SPEED_OF_LIGHT / outOpticalWavelength; }

void setOutputOpticalFrequency(double outOpticalFrequency) { outputOpticalFrequency = outOpticalFrequency; outputOpticalWavelength = outOpticalFrequency / outputOpticalFrequency; }

Functional Description

This block takes the two parts of the signal: in phase and in amplitude and it combines them to produce a complex signal that contains information about the amplitude and the phase.

This complex signal is multiplied by $\frac{1}{2}\sqrt{outputOpticalPower}$ in order to reintroduce the information about the energy (or power) of the signal. This signal corresponds to an optical signal and it can be a scalar or have two polarizations along perpendicular axis. It is the signal that is transmited to the receptor.

The binary signal is sent to the Bit Error Rate (BER) meaurement block.

Input Signals

Number : 2

Type : Sequence of impulses modulated by the filter (ContinuousTimeContiousAmplitude))

Output Signals

Number : 1 or 2

Type : Complex signal (optical) (ContinuousTimeContinuousAmplitude) and binary signal (DiscreteTimeDiscreteAmplitude)

Example

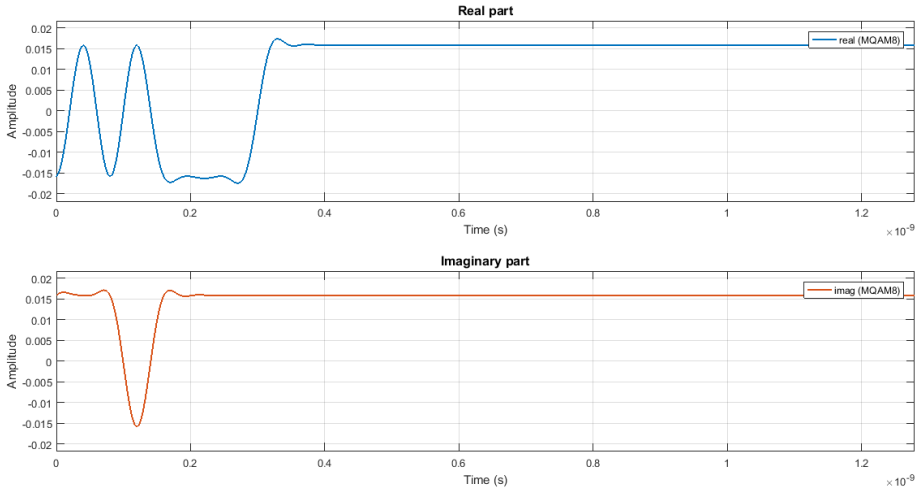

Figure 1: Example of a signal generated by this block for the initial binary signal "0100011101010101"