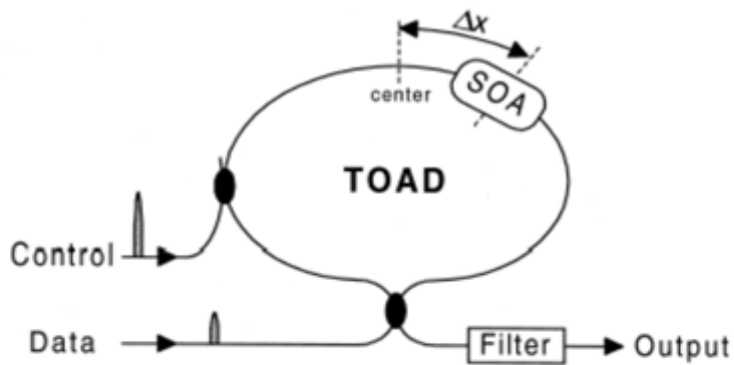


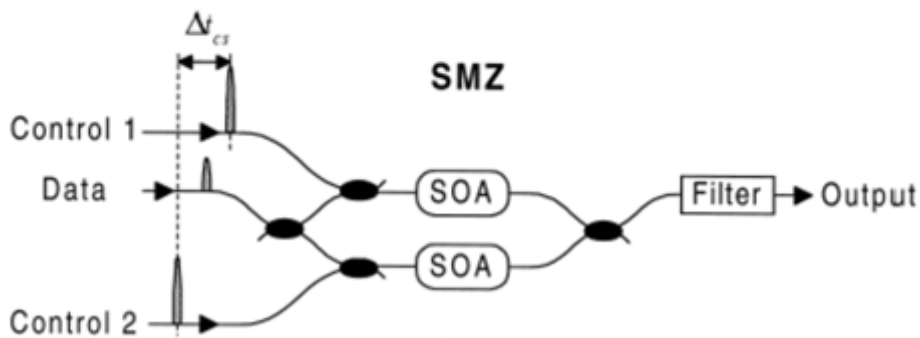
TDM Link and Demultiplexing in Time Domain

Tools Used: OptSim

The purpose of this example is to demonstrate channel demultiplexing in optical time division multiplexed (OTDM) network. Different configurations of fiber-based interferometric switches were proposed for demultiplexers in OTDM systems. One of such configurations is so called TOAD device - Terahertz Optical Asymmetric Demultiplexer - first proposed by P.Prucnal et al., which employs semiconductor optical amplifier (SOA) as nonlinear switching element:

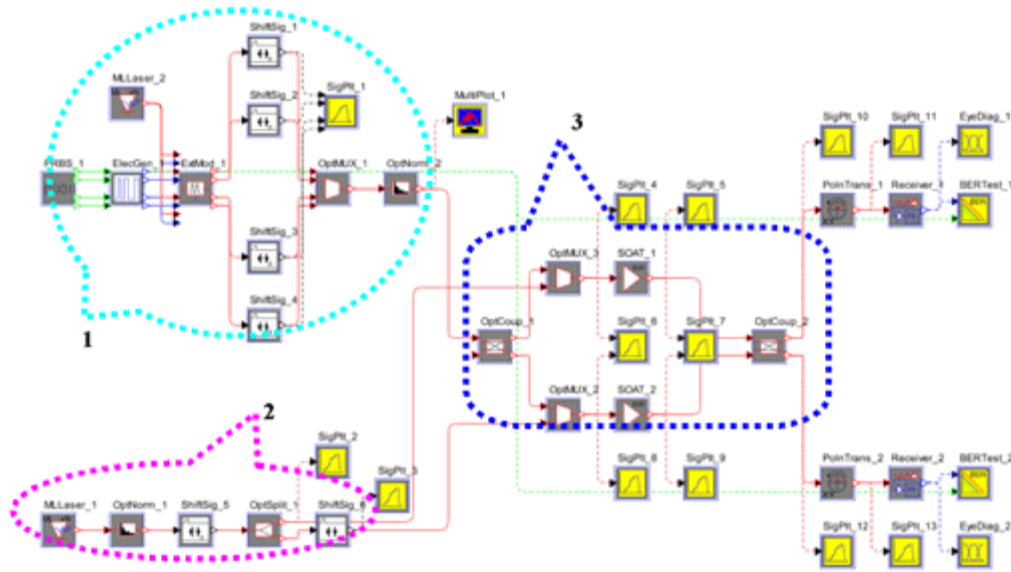


(a) Original TOAD configuration based on Sagnac interferometer

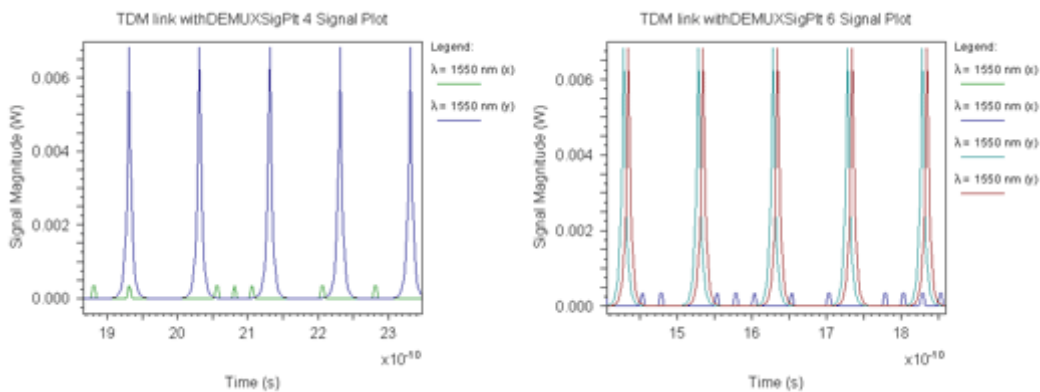


(b) Alternative TOAD configuration based on symmetric Mach-Zehnder interferometer

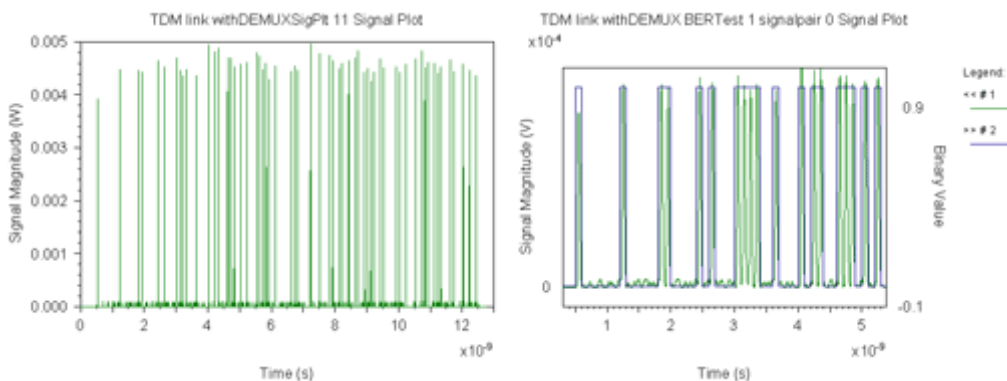
The same interferometric effect could be achieved using alternative configuration of TOAD based on symmetric Mach-Zehnder (SMZ) interferometer with SOA in each arm of SMZ. In this configuration the data and control signals co-propagate. Time delay between two control pulses is equal to the switching window duration, i.e. width of TDM channel in DEMUX applications. A polarization or wavelength filter is used at the output to reject the control signal and pass the switched data signals.

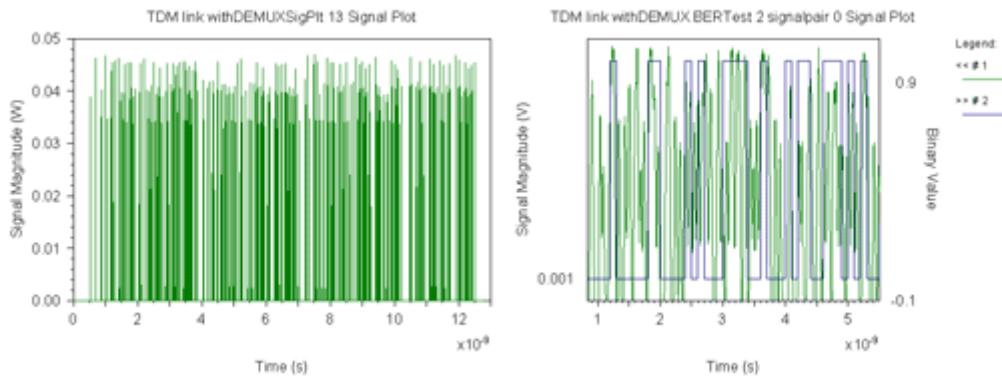


Signal data are injected to SMZ through the upper input. Two outputs of SMZ correspond to "switching" and "reflective" ports. Figure below shows the combined data and control signals at the inputs to SOA. Output signals from both ports then go through the linear polarizer block to separate control pulses from data. Inputs to the receiver blocks will have only data signals.

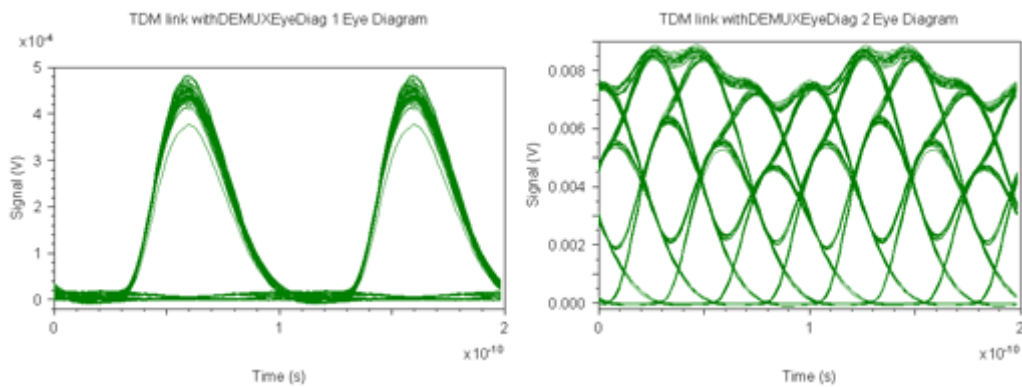


The following two figures show the signal output from switching and reflective ports respectively, after passing linear polarizer. Right-side plots show zoom-in details of signal aligned with bit pattern of demultiplexed channel (channel 1).





The following diagram shows corresponding eye diagrams at Receiver block for both ports. One can clearly see that output signal at switching port carries data information of demultiplexed channel only and interference from other channels is negligible, they are nicely suppressed.



In conclusion, the simulation results for SMZ-TOAD model confirmed its functionality as demultiplexer in TDM links.