Faculty of Electrical Engineering & Computer Science
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Implementation of automatic power-current measurement set-up.

ABSTRACT - Masterthesis

A LabVIEW program to characterise the performance of semiconductor sources like laser diodes and light emitting diodes is designed and developed using a measurement set-up. The measurement set-up in the hardware consists of a semiconductor source (laser diode), a laser diode current driver (FL500), a temperature controller (MPT 2500), an optical power meter consisting of a transimpedance amplifier (OPA 381) and USB-6009 data acquisition device (DAQ), an optical fiber and two power supply devices.

The labview program is designed such that the temperature input and the current input to the laser diode is controlled from the software via the DAQ device. The temperature controller is set to different temperatures and current in mA is fed to the laser diode. The FL500 laser current driver drives constant current to the laser diode. The light output from the laser diode is acquired by a photo diode (InGaAs) located in the optical power meter. The photo diode converts the light input to current output. A transimpedance amplifier also located in the optical power meter, provides corresponding gain for different intensities of the input current and converts it into voltage. The output voltage is acquired by the software using the USB-6009 Multi-IO-DAQ device.

In the program, the voltage is acquired for different input currents of the laser diode. This voltage is used to obtain the photo diode current and thereby the power of the laser diode in mW and dBm for corresponding input current in mA at different temperatures. The power-current characteristics are plotted on an XY graph for different temperatures. The measurement readings are then saved in ASCII format and stored for further analysis.

Finally, the investigations on power-current characteristics of DFB laser diode at 1550 nm are performed using the established set-up.