

Abstract: Periodic nanostructures, such as diffraction gratings, are widely used in photonic devices and recently in solar cells. Rapidly developing technologies of their preparation require improvements of characterization methods. In this thesis, the model method for the description of optical response of anisotropic diffraction gratings is introduced. This method is used to create a numerical model. The correctness of this model is verified on the basic example of the Fabry-Perot resonator, where the numerically calculated values of reflectivity correspond with the analytical ones. Afterwards, a new structure of a solar cell with diffraction grating was introduced. Parameters of this grating were optimized to obtain to highest efficiency of light trapping inside the solar cell. Finally, the optical and magneto-optical response of permalloy grating was calculated. It was found, that the factory parameters of the grating do not correspond with real values.