Modeling of Etalon with Planar or Curved Surfaces
Abstract

The simplest form of an optical etalon is a transparent plate with parallel surfaces. Such a structure forms a resonator, and the transmittance and reflectance vary with the thickness of etalon. Beside the simplest structure, etalons other configurations, with e.g. non-parallel surfaces and curved surfaces, are designed and used for different applications. With the non-sequential field tracing technique, several configurations of etalons are analyzed, and the difference in the output interference pattern is presented.
Modeling Task

- input plane wave
  - wavelength 532 nm
  - linearly polarized along y direction (also x for comparison)

- etalon
  - center thickness 100 µm
  - configurations
    a) planar-planar (parallel)
    b) planar-planar (tilted)
    c) cylindrical-planar
    d) planar-spherical

- intensity pattern
Constructive and destructive interference alternatively shows up when the thickness of etalon varies.

configuration
a) planar-planar (parallel)
- varying thickness from 100 to 99 µm
Results

configuration
b) planar-planar (non-parallel)
- center thickness 100 µm
- tilt of first surface

Linear interference fringes appear due to linear change of etalon thickness.
Results

c) cylindrical-planar
- center thickness 100 µm
- cylindrical surface radius 1 m

Polarization-dependent effect on the interference is taken into account.
Results

d) planar-spherical
- center thickness 100 µm
- spherical surface radius -1 m

Non-sequential simulation of etalon with curved surfaces takes only 2 seconds.
## Document Information

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