Determination of the optical constants (*n* and *k*) of inhomogeneous thin films with linear index profiles

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A new method for the determination of optical constants of absorbing inhomogeneous thin films is proposed. It requires measurements at normal incidence of the reflectance and transmittance of the film. In an inhomogeneous thin film, the optical constants vary along the thickness of the film. It has been reported in the literature that only the spatial integral value of the absorption index needs to be considered if its value is small. Therefore, in the proposed method, the mean value of the absorption index was used. The validity of this assumption was tested. On the other hand, the variation in the refractive index along the thickness of the film was taken into account. The method is discussed along with the nature of the solutions obtained and the effects of various parameters and assumptions. The method is applied successfully to inhomogeneous thin films of zirconium oxide.   © 2006 Optical Society of America

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