

ELLIPSOMETRY SIMULATION BY USING LIBERTY BASIC

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ABSTRACT

This study about developing a computer simulation on ellipsometry. Experiment on ellipsometry only gives data but the data cannot gives us better understanding on what happened on the wave in the medium. So, by this simulation it provides us better understanding and helped us to analyze the behavior on incident wave, reflection wave and transmitted wave. These simulations also visualize to us the resultant wave on ellipsometry experiment. For this stdudy I used the Liberty Basic programming to simulate the wave component and resultant in ellipsometry experiment. For this project there are 2 main cases and every main cases has 2 sub cases. The two sub case of first main case is (1a) wave incident from a medium with $n = 1$ striking the surface of a dielectric with $n = 2$. Second sub case is(1b) wave incident on bare absorbing surface which is $n1 = 1$ and $n2 = 2-.2i$.The second main case is reflection and transmission wave from a Film-Covered Surface. The first sub case is (2a) films whose thickness is $3/4$ of the wavelength of light in the film. This thickness is chosen to simplify the algebra: the cosines make the diagonal matrix elements zero, and the sinus in the off-diagonal elements is replaced by -1 . The first example considers a film of index 2 on a substrate of index 1.5. While the second case is the substrate is absorbing. The second sub case (2b) example considers a film of index 1.6 on a substrate of index $2 - .2i$.

CHAPTER 1

INTRODUCTION

1.0 BACKGROUND

A computer simulation is an attempt to model a real-life or hypothetical situation on a computer so that it can be studied to see how the system works (Roger, 2000). By changing variables, predictions may be made about the behavior of the system.

Simulation has become a useful part of modeling many natural systems in physics, chemistry and biology, and human systems in economics and social science (the computational sociology) as well as in engineering to gain insight into the operation of those systems. A good example of the usefulness of using computers to simulate can be found in the field of network traffic simulation. In such simulations, the model behavior will change each simulation according to the set of initial parameters assumed for the environment.

Traditionally, the formal modeling of systems has been via a mathematical model, which attempts to find analytical solutions enabling the prediction of the behavior of the system from a set of parameters and initial conditions (Roger, 2000). Computer simulation is often used as an adjunct to, or substitution for, modeling