

Abstract Submitted
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Simulation of a Null ellipsometer and a modulating ellipsometer using Mathcad CYNTHIA MONTGOMERY, WILHELMUS GEERTS, Texas State University at San Marcos — We developed MathCad worksheets that demonstrate the working of a null Ellipsometer and a modulating Ellipsometer. The worksheet of the null ellipsometer begins with the definition of the Jones matrices for the polarizer, the quarter wave plate, the sample, and the analyzer, followed by calculations of the Jones vectors of the light reflecting of the sample and the light incident upon the detector. The optimum polarizer and analyzer angles that will null the light through the instrument are determined graphically or by two while-loops on the worksheet. Delta and Psi are calculated from those angles and compared to theoretical values. The worksheet for the modulating ellipsometer begins with the definition of the Jones matrices of the polarizer, the sample, the photo-elastic modulator, and the analyzer. From the Jones vector of the light incident upon the detector, the time dependence of the intensity is calculated. The lock-in amplifiers are employed by determining the 1st and 2nd harmonics of the intensity signal. Delta and Psi are calculated from those Fourier coefficients and compared with the values found from the Fresnel coefficients.

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