
Preface

Optical measurement technique is a wide field because various optical phenomena and properties of light can be used to get information from an object that one wants to get information about. Optical phenomena usually involve light interaction with a medium. The interaction may be linear and involve absorption, dispersion, fluorescence or scattering of light. Properties of light such as amplitude, phase, polarization, wavelength and velocity in a medium provide a rich world to get information from an object. In the case of nonlinear optical phenomena the strong amplitude of the light is the key factor.

In this book we give a view of optical measurement techniques, from the perspective of the authors of this book, especially on applications in industry and life sciences. We are aware about the vast field of the topic. Therefore, we have not intended to cover all possible topics but focus on the following themes, which are applied optical spectroscopy, machine vision, laser velocimetry and measurement of surface quality, position, distance, and displacement.

As concerns industrial optical measurements the newest scientific inventions usually come rather late to practical use. Traditional methods for measurement are favored. Nevertheless, the traditional optical measurement techniques for industry have experienced a renaissance due to strong development of light sources, light detectors, novel type optical elements and CCD cameras.

The field of life sciences is rather wide. Especially the progress of nanotechnology has opened new fields such as nanomedicine and optical tomography. There will be an ever increasing demand to develop optical measurement and imaging technology for life science. In this book we report on some optical measurement techniques that are popular in life sciences.

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