FOREWORD

Computational optics as a science of system-design existed long before the computer era. With the advent of computers they began to be actively applied to this classic problem and by now computer-aided design has become established as a discipline in its own right.

But this does not exhaust the role of computers in optics. They have indeed played a revolutionary role in the production of a fundamentally new class of optical elements such as radiation focusers, wavefront correctors, radiation mode-component analysers, and so on. The use of computers in computer optics has been manifold: the solution of inverse problems in diffraction theory, simulations, control automata, processing, data visualization and interpretation, optimization of synthesizer-element parameters, data-base creation, and so forth.

Let us emphasize another important circumstance. Computer optics is not just computers in optics, but also optics in computers. A host of optical elements already in production are being applied in information processing, and in solving a whole series of interesting problems. Among these are Bessel optics elements, matched spatial filters, coordinate transforming elements, and so on. There is no doubt that elements of computer optics play a key role in developing a new generation of visual technology through the alliance of computers with the human capacity for optical recognition.

ACADEMICIAN E. P. VELIKHOV