



actuators



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Micromanipulation

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Nowadays, we meet microsystems in a variety of devices used in modern life. They are used, for example, in medicine, biology, industry, home appliances, transport, and aerospace. One of the main problems in the technological development of microsystems is their actuation. Several solutions have been suggested, such as electrostatic, electrothermal, electromagnetic, or piezoelectric actuation, although a valid solution seems to be still out of our reach.

Another crucial problem in designing, manufacturing, and operating microsystems for micromanipulation consists in the loss of some basic paradigms commonly used as a source of inspiration at the macroscale. The differences in designing at the two different scales may have either positive or negative effects. For example, an unthinkable structure in the day-life domain, as, for example, a long “cantilever” bridge over the Hudson river, would become possible after downscaling “everything” from road dimensions to the micro-world. Alternatively, a fantastic electric motor that works very well in our world, by virtue of the basic principles of electromagnetism, would become useless if scaled back to the micro cosmos.

This book opens a small window on the world of research, presenting a group of papers that try to respond to the challenge of increasing the efficiency and functionality of modern microsystems. A final little section is also dedicated to the development of new teaching methods successfully adopted in some university courses.



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