APPLICATIONS OF PETRI NETS FOR MODELING OF BIOLOGICAL PROCESSES

Summary

Rapid growth of the amount of available biological data made it clear that an analysis of complex biological processes can be made only with the support of mathematics and computer sciences. It is especially important nowadays when the systems biology approach is becoming more and more widely used in biological science. This new way of investigation of biological phenomena allows, at least in principle, to observe complex relationships between different parts of the analyzed system. These interactions may be crucial for the system's nature and behavior, so observing them may lead to important biological discoveries. Probably the most important part of this process consists in building of a formal model of the biological process. One of the promising methods of such an analysis is based on the theory of Petri nets. Models expressed in the language of this theory are very precise on the one hand, and on the other, they are intuitive, which makes their analysis easier in comparison, for example, to models based on ordinary differential equations. In this paper, a brief introduction to the theory of Petri nets is given and its applications for modeling of some exemplary biological processes are shortly discussed. Moreover, some extensions of the classical Petri nets and their biological applications are also presented.