

The Measurement of Oscillatory Relaxation Phenomena could be
a Source of Information about Discrete Transport Systems

W. Stephan, B. Kleutsch and E. Frehland

Fakultät für Biologie und Physik, Universität Konstanz
D-7750 Konstanz/Germany (F.R.)

In previous contributions (1,2) we have reported on the possibility of damped oscillatory behaviour in linear transport systems (e.g., ionic movement through single-file-pores in biological membranes). Now we are able to interpret these results under general aspects and to correlate them with the structural properties of the transport system (3):

- i) oscillatory behaviour may only occur, if there are interaction mechanisms within the transport system.
- ii) with increasing deterministic character of the ionic movement the damping of the oscillations decreases. The deterministic character is favoured by interionic repulsion forces and an outer electric field.
- iii) the more microscopic the structure of the transport system must be described, the weaker the oscillatory behaviour will become. The microscopicity is given in terms of the degree of regularity and the number of states of the system.

- 1 E. Frehland and P. Läger (1974), J.theor. Biol. 47, 189-207
- 2 W. Stephan and E. Frehland (1980), Biophys. Struct. Mech., Vol. 6 (Suppl.), 82
- 3 W. Stephan (1981), Oszillatorische Relaxationsphänomene als Strukturmerkmal zeitabhängigen Single-File-Transports, Dissertation, Universität Konstanz