When an accurate description of mass transport across membranes is required, e.g. in biology, chemical engineering, biotechnologies, biomedical apparatuses design, it often occurs that a diffusional barrier may not be considered as a single membrane.

In effect also the ubiquitous unstirred layers behave formally as a membrane-like diffusional barrier.

Series arrays of n membranes may be treated integrating local Kedem-Katchalsky practical equations across the thickness of the i-th membrane and subsequently, by means of recursive substitutions, correlating the volume and solute flows to their driving forces across the whole array. The equations obtained by this method contain, as a particular case, the ones already derived for a 2-membranes array and are a function both of the driving forces and of the solute concentration on one side of the array, C1. It is also deduced that:

I. the filtration coefficient $L_p$ for the array depends on the individual $L_p$’s of the n membranes and also on C1,

II. also the osmotic flow coefficient $L_{pd}$ is a function of C1,

III. the $-L_{pd}/L_p$ ratio appears to be the overall reflection coefficient of the array and does not depend on C1,

IV. the linear Darcy law for volume flow appears to be a limiting law for pure solvent,

V. an overall solute permeability, C1 independent, may be defined.

A computer program for the mass transport simulation according to the above mentioned equations will be described.