Micro, meso, macro

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The usual description of populations:

on the macroscopic level of interacting subpopulations of the system

in terms of deterministic systems of ODE or systems of Reaction–Diffusion Equations

The **deterministic evolution of concentrations of subpopulations** of the system rather than agents e.g.

individuals, **particles**, **cells**, **factors**, **persons**, **...**

In many cases the description on a **micro–scale** — or **meso–scale** — of **interacting agents** is more appropriate

A prototype:
the mathematical setting and relationships between:
micro, **meso** and **macro** — **kinetic theory** (of rarefied gases)

An important difference: in the case of biological or social sciences systems a basic microscopic theory, like **Newton Laws** in kinetic theory, **is not available**

(Mi) – at the level of interacting agents (”**micro–scale**”): **Markov jump processes** and corresponding continuous (linear) stochastic semigroups;

(Me) – at the level of the statistical description of a test–entity (”**meso–scale**”): **nonlinear ”kinetic” equations** and corresponding continuous nonlinear semigroups;

(Ma) – at the level of concentrations of subpopulations (”**macro–scale**”): **nonlinear systems of ODEs (or reaction–diffusion(–chemotaxis) equations)** and corresponding dynamical systems.

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- The evaporation problems,
- The Covid–19 pandemic.

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