Self–organization and multiscale approach:
A mathematical theory

Mirosław LACHOWICZ

University of Warsaw,
Institute of Applied Mathematics and Mechanics,
ul. Banacha 2, 02–097 Warsaw
`lachowic@mimuw.edu.pl`

A general class of mathematical structures (integro–differential equations) that models swarming behavior at the mesoscopic level is proposed. These structures lead to interesting mathematical problems of blow–up versus global existence ([2], [3]). Macroscopic ("*hydrodynamic*") limits are discussed ([4]). The corresponding individually–based (microscopic) model is proposed (cf. [1]).

References

[1] J. Banasiak, M. Lachowicz, *Methods of small parameter in mathematical biology*, Birkhäuser, Boston 2014.

[2] M. Lachowicz, H. Leszczyński, M. Parisot, *A simple kinetic equation of swarm formation: blow–up and global existence*, Appl. Math. Letters, 57, 2016, 104-107.

[3] M. Lachowicz, H. Leszczyński, M. Parisot, *Blow–up and global existence for a kinetic equation of swarm formation*, to appear.

[4] M. Parisot, M. Lachowicz, *A kinetic model for the formation of swarms with nonlinear interactions*, Kinetic Related Models, 9, 1, 131–164, 2016.