Research Project

At present, I'm studying these three directions;

[**Time asymptotics of the CH/AC equation**] For the CH/AC equation, several analysis of time asymptotics are done in these days by Dr. Israel. We would like to do more precise analysis. As a future work for a stochastic version of this equation, we would like to consider random attractor.

[**Thermal colloids model**] We try to study a colloid model considering with the influence of the heat of fluid. We consider the situation that one cell is fulfilled by certain fluid and there are several size of colloids in the fluid. Particles may aggregate and fragmentate each other. We have to start from to give a correct description of the system in view of modeling. This model will be described by the system of quasi-linear partial differential equations. We would like to do some mathematical analysis and computations. This is a joint work with Prof Muntean.

[**Monotonicity formula on Riemannian manifold**] Concerning to the analysis of the general critical points of the Modica-Mortola type energy in our previous work, we would like to consider the energy functional with anisotropic property. However it is known that in anisotropic case, monotonicity formula, which is important tool to show the regularity of sharp interfaces, does not hold generally. Thus as a next possibility, we would like to construct a monotonicity formula on Riemannian manifold. In order to consider this direction, first we have to start from understanding geometric property deeply.