In this talk, we consider different models of reaction-diffusion systems with high competition rate. These models are as follow:

- Strongly competing systems of Lotka-Volterra type: in this model particles or species annihilate on contact, and there is a common surface of separation [3];
- Segregation at distance: recently in [1] Caffarelli et al. proposed a model that species keep a positive distance;
- A class of singularly perturbed elliptic systems: as the competition rate tends to infinity then the product of all components tends to zero, [2].

We review different aspects and properties of these models. Then, we show existence and uniqueness of the solution for each model. Moreover, we use properties of limiting problem to construct efficient numerical simulations for given systems. For the last model, we present an explicit solution in the limiting case.

References

1. L. Caffarelli, S. Patrizi, V. Quitalo, On a long range segregation model, J. Eur. Math. Soc, 19 (2017), 3575–3628.
2. L. Caffarelli, J. o003 Tc 0.0p9(el)-63(q-63(u)72(o1(j S)-)-63(ffr(o1(14.08 0 Td ( )T5.565 1 Tf [(O)