

# A Class Of Singularly Perturbed Elliptic Systems With Asymptotic Phase Segregation

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**Abstract.** In this talk, we briefly explain a model of Reaction-Diffusion Systems characterized by high competition rates. Next, we study a class of singularly perturbed elliptic systems and their singular limit to a phase segregating system. We prove existence and uniqueness and study the asymptotic behavior of the limiting problem as the interaction rate tends to infinity. The limiting problem is a free boundary problem such that at each point in the domain at least one of the components is zero, which implies that all components can not coexist simultaneously.

We present a novel method, which provides an explicit solution of the limiting problem for a special choice of parameters. Moreover, we present some numerical simulations of the asymptotic problem.

## References

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