

## Asymptotic in ferromagnetism modeling

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### SUMMARY

In this presentation, we will focus on asymptotics in the framework of the ferromagnetism modeling. In particular, we study, from the static or the dynamic point of view, the most used model describing the magnetization configurations in ferromagnets: the micromagnetism introduced by W.-F. Brown [1].

Several kinds of asymptotic can be studied: of domain, in time or of parameters. For the first kind of asymptotics, domains, we will present works treating of the sheet limit [2], the nano-wire limit [3] or mono-domain particles [4]. For the second kind of asymptotic we will discuss in this presentation of the time asymptotic and in particular the hysteresis modeling [5].

During this presentation we will focus and mathematical analysis of this asymptotics, using tools such as  $\Gamma$ -convergence. Such models are exploited through numerous applications and in particular, we will present two control and stabilization applications for nano-wires and assembly of mono-domain particles.

**Keywords:** asymptotic analysis, Gamma-convergence, modeling, micromagnetism

**AMS Classification:** 35M13, 58J37, 35Q93

### References

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