Master Plan - Isak Hammer -

Solving Cahn-Hilliard Equation using CutCIP

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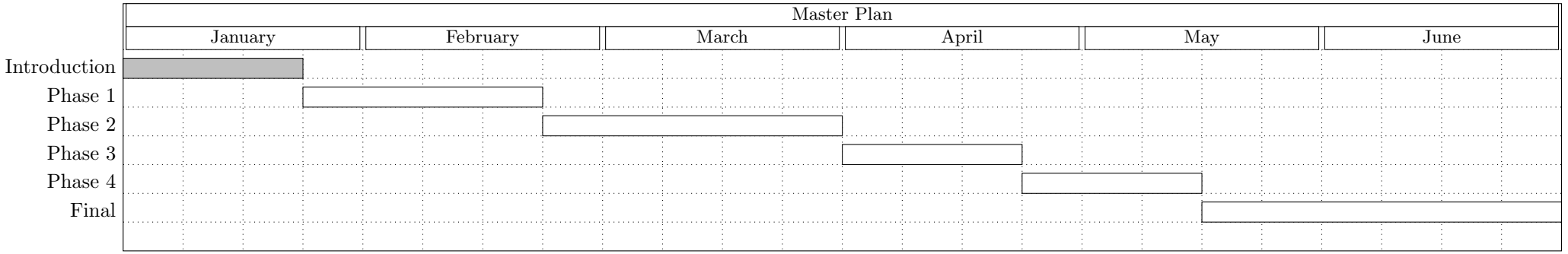
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Report**
Estimated time	2-3 Weeks	4-5 Weeks	2 Weeks	3 Weeks	
Problem	CutDG for $-\Delta u = f$	CutCIP for $\Delta^2 u = f$	$\partial_t u + \Delta^2 u = g$	$\partial_t u + \Delta^2 u + f(u) = g$	
Goals	• Analysis ☐ Coercivity ☐ Boundedness • Implementation ☐ L^2 convergence ☐ H^1 convergence	• Analysis ☐ Coercivity ☐ Boundedness ☐ A priori estimates ☐ Condition number † • Implementation ☐ L^2 convergence ☐ H^1 convergence	• Analysis ☐ BDF analysis • Implementation ☐ L^2L^2 convergence ☐ L^2H^1 convergence	• Implementation ☐ Fixed point method ☐ L^2L^2 convergence ☐ L^2H^1 convergence	☐ Introduction ☐ CutDG $-\Delta u = f$ ☐ Formulation ☐ Closed and bounded ☐ Numerical exp. ☐ CutCIP for $\Delta^2 u = f$ ☐ Formulation ☐ Closed and bounded ☐ A priori Estimates ☐ Numerical experiments ☐ CutCIP for $\partial_t u + \Delta^2 u = g$ ☐ Time discretization ☐ Numerical experiments ☐ CutCIP for $\partial_t u + \Delta^2 u + f(u) = g$ ☐ Fixed point methods ☐ Numerical experiments ☐ Conclusion
Comments	Mostly based on (Gürkan and Massing, 2019)	† Not prioritized			
Digression		2nd order mixed formulation	2nd order mixed formulation	2nd order mixed formulation	



References

Gürkan, Ceren and André Massing (2019). “A stabilized cut discontinuous Galerkin framework for elliptic boundary value and interface problems”. In: *Computer Methods in Applied Mechanics and Engineering* 348, pp. 466–499.