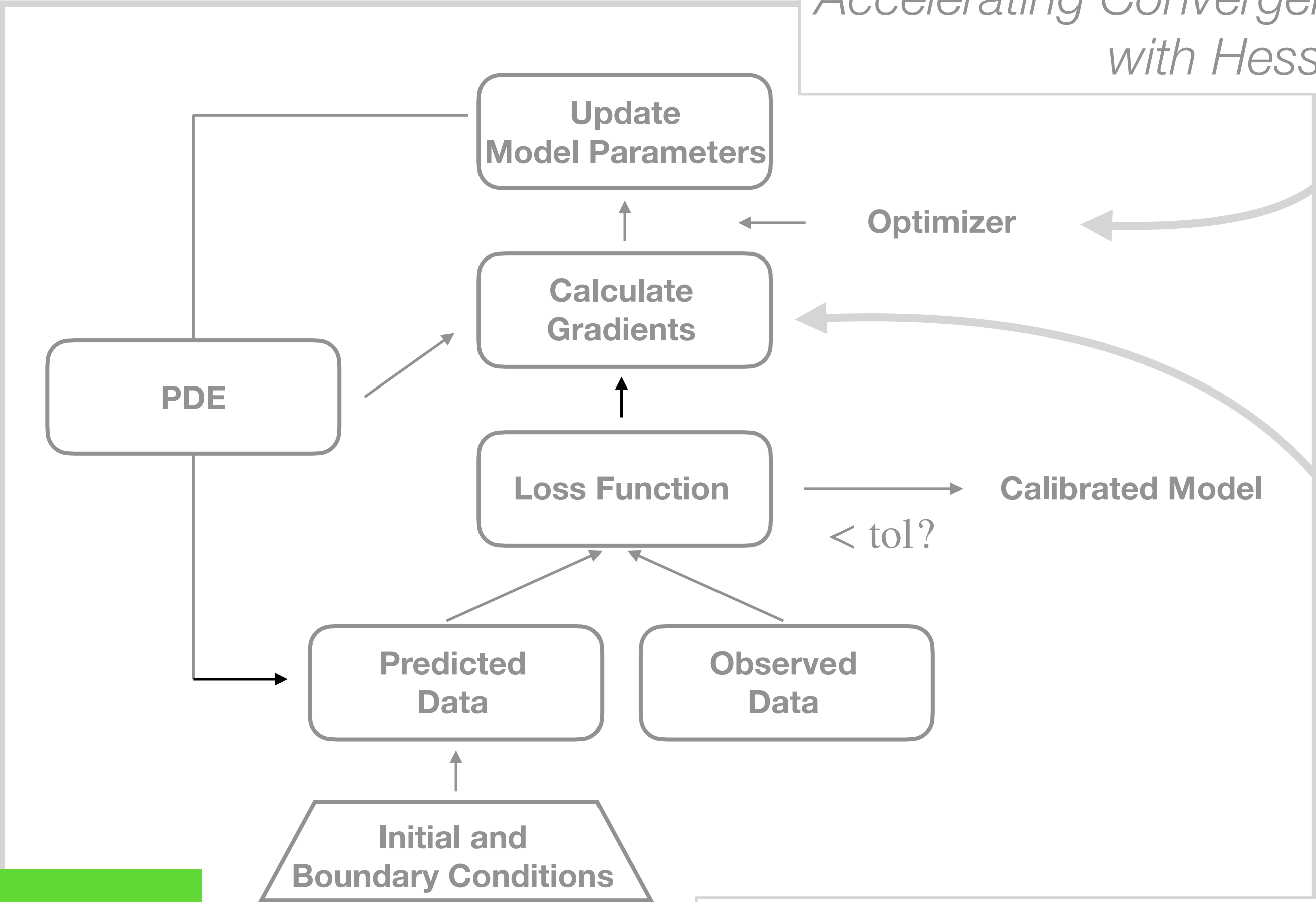


Contribution 1
Software Implementation
ADCME: Gradient Calculation and Inverse Modeling Pipelining



Contribution 2
1st Order Physics Constrained Learning
Calculating Gradients for Implicit & Iterative Operators

Contribution 3
2nd Order Physics Constrained Learning
Accelerating Convergence and Improving Accuracy with Hessian Information