Project Proposal

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In *no more than two pages* draft a comprehensive project proposal under the three headings below and support your statements with appropriate references (use any standard citation style).

Background   Situate the problem you wish to study in its broader scientific or engineering context. Explain why the phenomenon or application is interesting, noteworthy, or timely, and cite at least one peer-reviewed source that motivates the work.

Objective   State the precise question your project will answer once complete. Identify the governing partial differential equation(s) you will solve, together with any relevant initial or boundary conditions. Describe the physical or mathematical quantities of interest (e.g. fluxes, error norms, conserved invariants) that you will extract from the computed solution to assess success.

Methodology   Outline the numerical strategy you will employ. Specify the discretization technique (finite difference, finite volume, finite element, spectral, etc.) and justify its suitability for the chosen PDE. Describe how you will conduct a grid-refinement (or *p*-refinement) study to quantify the order of accuracy and establish convergence. Mention any software libraries or custom code you expect to develop, and comment on anticipated computational cost or resources.