Some (biased) Advice

- Never believe your results
- Check for both spatial and temporal convergence
- Non-dimensionalize prudently
- Begin and end with dimensional analysis
- Do not mistake simulation for experiment
- Do not mistake simulation for theory
- Stay close to the real data

References

- J. P. Boyd, *Fourier and Chebyshev Spectral Methods, 2nd Ed* (Dover)
  - A great introduction to the topic; some of the sections are dated, but it has a great discussion of many of the details I glossed over (convergence of Fourier and Chebyshev coefficients in various situations, notably)
- U. Ascher, *Numerical Methods for Evolutionary Differential Equations* (SIAM)
  - Excellent discussion of timestepping. He's not a fan of spectral methods, but no one's perfect
- Burns et al, "Dedalus: A flexible framework for numerical simulations with spectral methods", *Phys Rev Res.* 2, 023068 (2020)
  - A detailed overview of the Dedalus code version 2
- Vasil et al, "Tensor calculus in spherical coordinates using Jacobi polynomials Part I: Mathematical analysis and derivations" *J. Comp. Phys.* (2019)
- Lecoanet et al, "Tensor calculus in spherical coordinates using Jacobi polynomials Part II: Implementation and examples", *J. Comp. Phys.* (2019)
  - Some light reading on spherical coordinates
- NISF Digital Library of Mathematical Functions (https://dlmf.nist.gov/)
  - Particularly Ch 18 on Orthogonal Polynomials