PLOTS OF THE SOLUTIONS TO THE ODE IN EXERCISE 2, PAGE 100 IN LOGAN

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The plots below are produced using SymPy to produce the Taylor series for the perturbation solution. The numerical solution is obtained discretizing the ODE with central differences. As we can see, some more work is needed to get a reliable nummerical solution for large t.

plots of the solution to the ODE in ex. 2 Logan p. 101

Legend:
- Taylor Expansion of ODE
- Perturbation solution
- Taylor Expansion of the perturbed solution
- Numerical solution, $\Delta_t = 0.01$

plots of the solution to the ODE in ex. 2 Logan p. 101

Legend:
- Taylor Expansion of ODE
- Perturbation solution
- Taylor Expansion of the perturbed solution
- Numerical solution, $\Delta_t = 0.01$

plots of the solution to the ODE in ex. 2 Logan p. 101

Taylor Expansion of ODE
Perturbation solution
Taylor Expansion of the perturbed solution
Numerical solution, $\Delta_t = 0.001$

plots of the solution to the ODE in ex. 2 Logan p. 101

difference between the two taylor expansions