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Teaching an ODE Course with CoCalc, Sage, Jupyter Notebooks, and LaTeX.

The use of technology for the teaching and learning of ordinary differential equations is now widely accepted. There is a wide variety of software such as Sage, MatLab, Maple, or Mathematica that can be used in the classroom. In addition, menu driven applications such as dfield and pplane can be used to find and plot solutions to equations or systems of equations. The next step is to provide an environment for using these tools that meets the needs of both the students and the instructor. CoCalc, a web-based cloud computing and course management platform for computational mathematics, can be used as an efficient method to provide examples and manage assignments. Using Jupyter notebooks, students can write their solutions in LaTeX and incorporate Sage computations into a single document. Since students only need to write their solutions in a Markdown cell, many of the barriers to learning LaTeX are removed. Furthermore, students can write executable Sage commands in a notebook. CoCalc makes it easy to collect, grade, and return these assignments. We will demonstrate how CoCalc and Jupyter notebooks can be used to improve an ODE course. (Received August 20, 2018)