

Introducing challenging modeling problems early with **chebfun** add-ons for MATLAB.

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Abstract

Early introduction of challenging and meaningful problems can significantly enhance learning. In a beginning ODEs course, many instructors shy away from “messy modeling problems” because they often require significant numerical work to get meaningful results. But with the **chebfun** add-ons for MATLAB, much of the numerical “overhead” for solving these problems can be lessened or even eliminated. I will briefly demonstrate the use of the **chebfun** add-ons and then discuss some examples of challenging modeling exercises which can be completed as lab projects in a first ODEs course with minimal additional support beyond the typical course material. (The **chebfun** add-ons are open-source and available freely from their authors at www.chebfun.org)