This is a collection of six lab templates for Part 1: "Algebra and geometry" of the book "Exploring mathematics with CAS assistance."

A template for each lab is provided in two formats: as a **Jupyter Notebook (JN)** and .**pdf file**.

List of included lab template files (in JN format) and corresponding labs from the book:

1. Lab2euler_lineT.ipynb – Lab 2: Euler line.
2. Lab3simson_lineT.ipynb – Lab 3: Simson line.
3. Lab4_PPT_T.ipynb – Lab 4: Plotting legs of primitive Pythagorean legs.
4. Lab5solvingILP_T.ipynb – Lab 5: Industrial application of an LDE in three variables.
5. Lab6_Vieta_subsT.ipynb – Lab 6: Solving cubic equation using Vieta's substitution.
6. Lab7impliciT.ipynb – Lab 7: Implicitization of plane rational curves.

Jupyter Notebook is an open-source web application that allows one to create and share codes and documents. JNs in this collection are intentionally incomplete (capital T in file names stands for "template"). They include code lines with removed fragments of code (blanks). For instructors teaching the course based on the book, complete versions of these JNs can be provided by request.

The book is written in a computer-agnostic way without any specific code for the labs. The choice of software is left to the instructor using the book or the independent self-learner. The pdf versions provide the option to quicky look at one of the ways for computer implementation of the labs.

The templates use Python and Sympy software and include numerous comments on operators used in the codes. The users who need more information on any particular Python/Sympy function can use various sources on the web including official documentation, tutorials, and blogs. Students can communicate their questions with the instructor who is teaching a class based on the book and uses Python/Sympy for coding.

After completing partially blank code lines, the user can run any of the JNs using a local environment (for example, part of the freely available Anaconda installation). The convenient alternative can be running JN in the cloud. There are many services that allow one to create, edit, share, and run JNs, like Google Laboratory (free) or CoCalc (various plan options).

The codes are written by Lydia Novozhilova. Two important guiding principles in writing the codes are:

- keep the codes as simple and intuitive as possible; minimize using powerful “black-box” Python functions encapsulating several simple steps that are within understanding of the intended user of these JNs
- structure the problems by splitting solutions into steps (just like suggested in the book) and encode the steps as short help functions

The author will be grateful for any suggestions to improve these JNs, correct typos or mistakes, or use an alternative approach to solving any problem encoded in this collection.