Short documentation of the power calculation software for comparing dose-response curves v1.0

Requirements:
- Python 3.7
- numpy, pandas, scipy, sklearn, PyQt5

For the graphical user interface, please start the file `StartPowerGUI.py`

For scripted examples, please start the files `StartPowerScript_Application1.py` or `StartPowerScript_Application2.py`.

To setup parameter files for the simulated xenografts please use `InputApplication1.xlsx` or `InputApplication2.xlsx` as a template.

Graphical user interface:

Workflow: set parameters (left), open parameter file (bottom), calculate power (bottom)
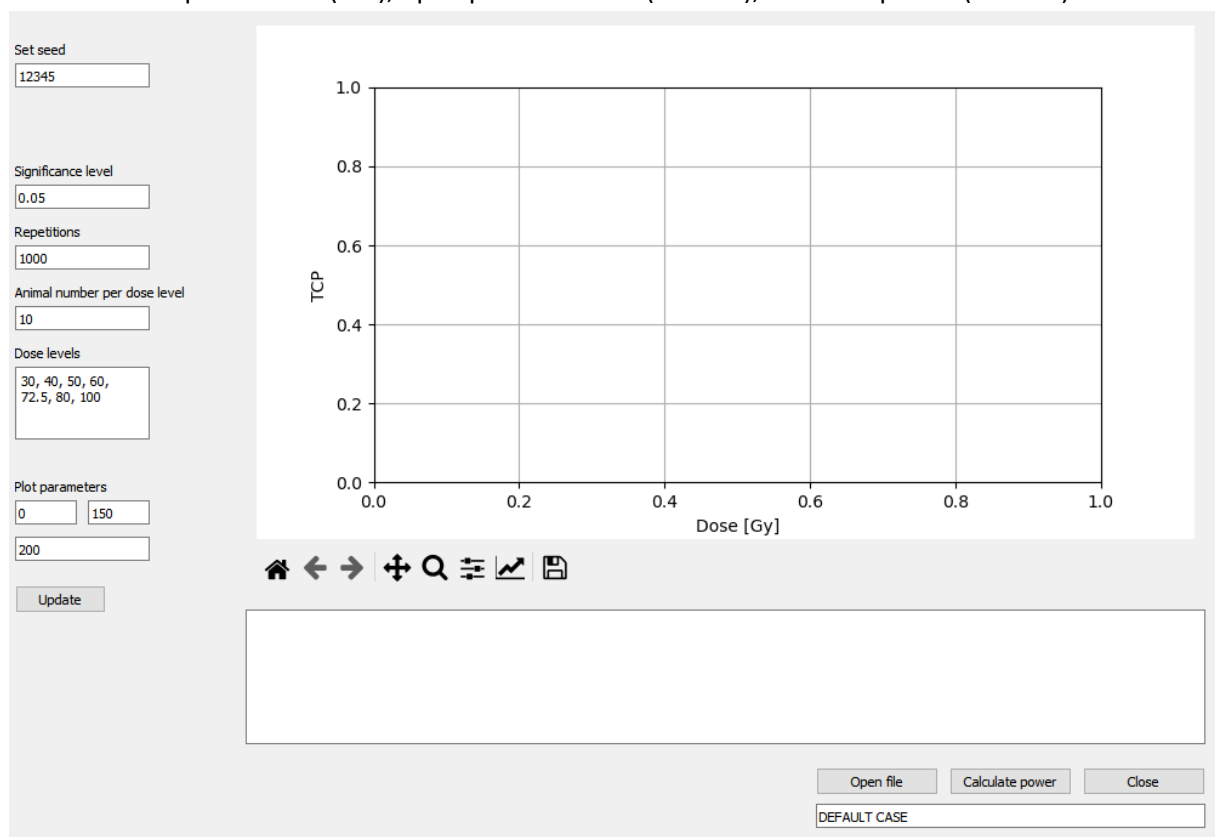
Description:

Left column, from top to bottom:
- Seed: changing the seed will produce different random numbers, i.e., change the results. With fixed seed, results are reproducible.
- The significance level α is often set to 0.05 (type 1 error)
- The number of repetitions determines the error of the calculated power. With increasing number of repetitions, the error decreases. A value of 10000 is recommended for the final calculation.

- For the number of animals per dose group per arm N, the power is calculated. The total animal number will be: 2 (arms) times the number of dose levels times N.
- Dose levels: Dose levels should be defined comma separated such that they cover preferably the steep region of the dose-response curve.
- Plot parameters: minimal dose, maximal dose, number of intermediate points for plotting
- The update button saves the set parameters.

Bottom row from left to right (buttons):
- Open the file with the additional parameters describing the dose response of the participating xenografts (see `InputApplication1.xlsx` and `InputApplication2.xlsx` as examples)
- Calculate power: Start power calculation
- Close: Close the software

The plot window shows the median regression curves of both simulated arms. The edit below shows the median parameters and the power once the calculation has finished.

When starting the program, a default parameter set characterizing a previous experiment from a head and neck squamous cell carcinoma xenograft FaDu treated with fractionated radiotherapy [1] is available for testing.

References:

[1]   Gurtner K, Deuse Y, Bütof R, et al. Diverse effects of combined radiotherapy and EGFR inhibition with antibodies or TK inhibitors on local tumour control and correlation with EGFR gene expression. Radiother Oncol 2011;99:323–30.