

## **Description of the software implementing the mathematical model**

The model is written in C++ 17, using the QT widget toolkit and application framework version 5.15.2 developed by The Qt Company (Espoo, Finland; official website - [www.qt.io](http://www.qt.io)). Additionally we used QCustomPlot 2.1.0 which is a third-party Qt C++ widget for plotting and data visualization, by Emanuel Eichhammer (official website - <https://www.qcustomplot.com/>), distributed under the GPL license.

The software is distributed under the GPL version 3.0 license [<https://www.gnu.org/licenses/quick-guide-gplv3.en.html>]. All users have the freedom to use the software for any purpose, the freedom to change the software to suit their needs, the freedom to share the software with anybody, and the freedom to share the changes they make.

The source code was tested on IBM PC with Windows 10 operating system.

Features of the software:

- The program solves the mathematical model using the Euler approach, the integration step could be changed by the user.
- Time-series of the model signals are plotted on the main form of the program after the simulation.
- The time-series of the model ECG signals,  $\alpha$ -sympathetic activity signals,  $\beta$ -sympathetic activity signals, parasympathetic activity signals, lung volume signals, and arterial pressure signals could be saved to the .txt files at any sampling rate, as long as it is lower than integration step used when solving the model.
- The interface of the model provides the ability to change the parameters of the model.
- The spectral and statistical characteristics are automatically estimated and printed on the main form of the program after each simulation.