

A Runge-Kutta-Fehlberg solver using traits and Eigen (part 2)

Paolo Joseph Baioni

April 23, 2025

Exercises

Address the following exercises, taking [09-rkf/02-rkf-solution/](#) as starting point:

1. Use the provided solver to solve the SIR model presented in <https://arxiv.org/pdf/2003.00122.pdf> (more realistic coefficients can be found [here](#)).
2. Implement the Fehlberg12 and the Dormand-Prince methods (https://en.wikipedia.org/wiki/List_of_Runge%E2%80%9993Kutta_methods#Embedded_methods)
3. Modify the constructor of the RKF class so that the chosen RKF method has a default value.
4. Define an aggregate class to handle the input options for the RKF class, and provide the corresponding setter/getter methods and possibly a method to parse options from file.
5. Implement the factory pattern to the ButcherArray class, so that the actual method can be chosen dynamically exploiting polymorphism.