

Generic factory and code refactoring:  
A Runge-Kutta-Fehlberg solver  
using traits and concepts  
(part II)

Matteo Caldana

27/04/2022

# Refactoring the RKF solver

Starting from the solution to the previous lab:

1. define a class to handle the input options for the RKF class, provide the corresponding setter method and a method to parse options from a GetPot file;
2. implement the Fehlberg12 and the Dormand-Prince methods ([https://en.wikipedia.org/wiki/List\\_of\\_Runge%E2%80%93Kutta\\_methods#Embedded\\_methods](https://en.wikipedia.org/wiki/List_of_Runge%E2%80%93Kutta_methods#Embedded_methods)) and use them to solve the Lorenz system ([https://en.wikipedia.org/wiki/Lorenz\\_system](https://en.wikipedia.org/wiki/Lorenz_system)). Plot the solution both as a function of time and in the phase space;
3. implement a custom factory for the ButcherArray class, so that the actual method can be polymorphically selected at runtime from the GetPot file;
4. replace your custom-defined factory using the generic factory provided in the generic-factory folder, and provide a proxy for registering all RKF methods implemented.