Marksheet for first coursework MTH739

Completion of physical scenarios - worth 50% total

Component	Max mark available	Mark awarded	Feedback/Comments
Implement a two body system made up of two stars with a mass ratio 1:2 undergoing multiple stable orbits	10	10	Good use of star wars references
Implement a three body system made up of 3 stars of equal mass, and model the stable solution	10	10	
Model 3 body system in which stars display chaotic behaviour, with one star being ejected from the system	5	5	
Classes for stars, supergiants and stellar systems with multiple star components. Use of inheritance where possible and appropriate	5	5	Very good - uses single stellar system that can cope with any number of stars - you should try it for more than 3!
Basic implementation of merging for hypergiants including conservation of momentum	4	4	
Hypergiants working - a few orbits are obtained before a merger of two of the objects. The hypergiants should have 3 similar but different masses, e.g. a ratio of 0.8 : 1.0 : 1.2	4	3	This looks like it is very close to working - I actually think it may be just that you are still plotting the 1st object - although you set the mass to zero it will still continue to move and be affected by the other bodies (although it will not affect them). Just removing it from the plot after merger would be sufficient.
Plots of the orbital trajectories of the stars over time	3	3	
Phase diagrams for the position and velocities of the component stars.	3	2	Explain meaning of phase plots - conservation of energy. Could also increase time resolution to remove "spikiness" in corners
Correct use of solve_ivp() including rtol param	3	3	
Correct use of midpoint or RK4 method	3	3	
Total	50	48	

Defensive programming - worth 20% total

Component	Max mark available	Mark awarded	Feedback/Comments
Use of asserts and tests to prevent user error / check functioning	10	10	Excellent use of tests and asserts
Convergence test for the RK method	10	10	
Total	20	20	

Readability - worth 20% total

Component	Max mark available	Mark awarded	Feedback/Comments
Use of code conventions of course, naming and clarity etc	15	15	
Appropriate commenting	5	5	
Total	20	20	

Documentation - worth 10% total

Component	Max mark available	Mark awarded	Feedback/Comments
Documentation is well written	6	6	
Good use of markdown formatting	4	4	
Total	10	10	

TOTAL MARKS

Component	Max mark available	Mark awarded	Feedback/Comments
Implementation	50	48	
Defensive programming	20	20	
Readability	20	20	
Documentation	10	10	
Total as a percentage	100	98	
Total out of 20 marks for course	20	20	