Test Report: Library of ODE Solvers (LODES)

Paul Aoanan

December 15, 2017

1 Revision History

Date	Version	Notes
December 15, 2017	1.0	Initial draft.

2 Symbols, Abbreviations and Acronyms

2.1 Table of Symbols

The table that follows summarizes the symbols used in this document along with their units. The choice of symbols was made to be consistent with the numeral analysis and ordinary differential equation literature and with existing documentation for solving ordinary differential equations. The symbols are listed in alphabetical order.

symbol	unit	type	description
dy/dx	-	$\mathbb{R}$	Rate of change of y with respect to x
$\varepsilon_{\text{relative}}$	-	$\mathbb{R}$	The relative error
F	-	$\mathbb{R}^3 \to \mathbb{R}$	Order function applied to the Runge Kutta Method
$f(x, y)$	-	$\mathbb{R}^2 \to \mathbb{R}$	Explicit form of the ODE function containing (x, y)
$f_x(x, y)$	-	$\mathbb{R}^2 \to \mathbb{R}$	Explicit form of the derivative of $f(x, y)$ with respect to x
$f_y(x, y)$	-	$\mathbb{R}^2 \to \mathbb{R}$	Explicit form of the derivative of $f(x, y)$ with respect to y
h	-	$\mathbb{R}$. $h > 0$	Step-size from $x_{(0)}$ to the next point $x_{(1)}$, where $x_{(1)} = x_{(0)} + h$
K_1, K_2, K_3, K_4	$\mathbb{R}$	-	Intermediary variables used in the Runge-Kutta method
n	-	$\mathbb{R}$	Reference recursion step
o	-	$\mathbb{R}$	Solution variable
T	-	-	Test
x_0	-	$\mathbb{R}$	Initial value x
x_{k}	-	$\mathbb{R}$	Final value x
x_{n}	-	$\mathbb{R}$	Intermediate n^{th} value x
y_0	-	$\mathbb{R}$	Initial value y
y_{k}	-	$\mathbb{R}$	Final value y
y_{n}	-	$\mathbb{R}$	Intermediate n^{th} value y
y'	-	$\mathbb{R} \to \mathbb{R}$	Implicit form of the first order ODE $= f(x, y)$
$y^{(\text{n})}$	-	$\mathbb{R} \to \mathbb{R}$	Implicit form of the ODE to the n^{th} order
y	-	1 x $\mathbb{R}^k$	The array containing all intermediate y_{n} values

[symbols, abbreviations or acronyms – you can reference the SRS tables if needed —SS]

Contents

List of Tables

List of Figures

This document ..

3 Functional Requirements Evaluation

4 Nonfunctional Requirements Evaluation

4.1 Usability

4.2 Performance

4.3 etc.

5 Comparison to Existing Implementation

This section will not be appropriate for every project.

6 Unit Testing

7 Changes Due to Testing

8 Automated Testing

9 Trace to Requirements

10 Trace to Modules

11 Code Coverage Metrics