|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TEST: Test Runge-Kutta 3rd Order Reaction Solver** | | | | | | | | | | | | | | | | C:\Documents and Settings\jamiea\Local Settings\Temporary Internet Files\Content.IE5\W5MFG1IZ\MC900441310[1].PNGPassed | |
| Conceptualization of Test | | | | | | | | | Test Description  Linear reaction ordinary differential equation solver for constant first order linear decay. | | | | | | | | |
| Test Setup | | | | | | | | | | | | | | | | | |
| Process Tested | | | Dispersion Coeff.  (m2/s) | Decay Rate  (1/sec.) | | | Flux Limiter (on/off) | | | | Domain Length  (m) | | # Grid Cells | | Test Time (sec) | | # Time Steps |
| Advection (Flow) | Diffusion (Mixing) | Reaction (Decay) |
| - | - | ✓ | NA | 0.01 | | | NA | | | | NA | | 1 | | 160.0 | | 10 |
| 2 | | 20 |
| 4 | | 40 |
|  | | | | | | | | | | | | | | | | | |
| Dimensionless Parameters | | | | | | | | | | | | | | | | | |
| Courant #: Courant Number.png | | Value ≥1 for numerical stability | | | | # Grid Cells | | 1 | | 2 | | 4 | | Stable: | | | |
| Courant # | | NA | | NA | | NA | |
| Mesh Peclet #: Mesh Peclet Number.png | | ≤1 dispersion dominates  >1 advection dominates | | | | # Grid Cells | | 1 | | 2 | | 4 | |  | | | |
| Peclet # | | NA | | NA | | NA | |
|  | | | | | | | | | | | | | | | | | |
| Test Results | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | |
| Linear decay equation solves by Runnge-Kutta 3rd order accurate solver and results are compared with the analytical solution. | | | | | | | | | | | | | | | | | |
| Numerical Order of Accuracy and Convergence | | | | | | | | | | | | | | | | | |
| Grid Refinement  (# Time Steps) | | Convergence Measure Target: value ≥3 | | | Comments | | | | | | | | | | | | |
| 10-20 | | 3.09 | | | Test officially passes the defined criteria | | | | | | | | | | | | |
| 20-40 | | 3.04 | | | Test officially passes the defined criteria | | | | | | | | | | | | |
| Bottom Line: Bottom Line: Test passes the defined criteria with 3rd order convergence ratio and the results are restrained in the acceptable range of accuracy. | | | | | | | | | | | | | | | | | |