|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TEST: Advection Reaction Uniform Flow** | | | | | | | | | | | | | | | |
| Conceptualization of Test  Advection uniform flow test.png | | | | | | | | | Test Description: (Do we need this?)  Advection uniform flow, Gaussian mass distribution, linear decay | | | | | | |
| Test Setup | | | | | | | | | | | | | | | |
| Process Tested | | | | Dispersion Coeff.  (m2/s) | Decay Rate  (1/sec) | | | Flux Limiter | | Domain Length | # Grid Cells | | | Time Step (S) | # Time Steps |
| Advection (Flow) | Diffusion (Mixing) | Reaction (Decay) | |
| ✓ | - | ✓ | | NA | 0.0003 | | | Off | | 51.2 km | 256 | | | 18.750 | 32 |
| 512 | | | 9.3750 | 64 |
| 1024 | | | 4.6875 | 128 |
|  | | | | | | | | | | | | | | | |
| Dimensionless Parameters | | | | | | | | | | | | | | | |
| Courant #: Courant Number.png | | | Mesh Peclet #: Mesh Peclet Number.png | | | | Diffusion #: Diffusion Number.png | | | | | DamKohler #  Damkohler Number.png | | | |
| ≤1: required for stability | | | ≤1: dispersion dominant | | | | ≤0: required for stability | | | | | ≤1: Advection dominates | | | |
| 0.75 | | | NA | | | | NA | | | | | ?????? | | | |
| Stable | | |  | | | |  | | | | |  | | | |
|  | | | | | | | | | | | | | | | |
| Test Results | | | | | | | | | | | | | | | |
| Plot of Results | | | | | | | | | Comments :  Advection subjected to uniform flow, and a linear decay equation solves by Heun ODE solver and results are compared with analytical solution | | | | | | |
| Numerical Order of Accuracy and Convergence | | | | | | | | | | | | | | | |
| Grid Cell Refinement (Increase # Grid Cells) | | Order of Accuracy Measure (L-1norm) Target: ≤ 1% | | | | Convergence Measure  (L-1 norm) Target: value ≥2 | | | | | | | Comments | | |
| 256-512 | | 8.88E-6 | | | | 2.05 | | | | | | | Test officially passes the defined criteria | | |
| 2.05E-6 | | | | 2nd Order Accurate | | | | | | |
| 512-1024 | | 4.93E-7 | | | | 2.11 | | | | | | |
| OK | | | | 2nd Order Accurate | | | | | | |
| Bottom Line: (What should I mention here?) | | | | | | | | | | | | | | | |