|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TEST: Advection of Uniform Bidirectional Flow with Neumann Boundary Condition** | | | | | | | | | | | | | | | | C:\Documents and Settings\jamiea\Local Settings\Temporary Internet Files\Content.IE5\W5MFG1IZ\MC900441310[1].PNGPassed | |
| Conceptualization of Test | | | | | | | | | Test Description  Uniform flow field, Gaussian initial distribution of mass, flux boundary condition, moves forward for T/2 and backward for T/2 and the results compares with the initial condition. | | | | | | | | |
| Test Setup | | | | | | | | | | | | | | | | | |
| Process Tested | | | Dispersion Coeff.  (m2/s) | Decay Rate  (1/sec) | | | Flux Limiter (on/off) | | | | Domain Length  (km) | | # Grid Cells | | Test Time (sec) | | # Time Steps |
| Advection (Flow) | Diffusion (Mixing) | Reaction (Decay) |
| ✓ | - | - | NA | NA | | | Off | | | | 25.6 | | 64 | | 2560 | | 64 |
| 128 | | 128 |
| 256 | | 256 |
|  | | | | | | | | | | | | | | | | | |
| Dimensionless Parameters | | | | | | | | | | | | | | | | | |
| Courant #: Courant Number.png | | Value ≥1 for numerical stability | | | | # Grid Cells | | 64 | | 128 | | 256 | | Stable: ✓ | | | |
| Courant # | | 0.60 | | 0.60 | | 0.60 | |
| Mesh Peclet #: Mesh Peclet Number.png | | ≤1 dispersion dominates  >1 advection dominates | | | | # Grid Cells | | 64 | | 128 | | 256 | | Advection Dominates | | | |
| Peclet # | | NA | | NA | | NA | |
|  | | | | | | | | | | | | | | | | | |
| Test Results | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | |
| The initial mass distribution is shifted forward &backward and the result is compared with initial values | | | | | | | | | | | | | | | | | |
| Numerical Order of Accuracy and Convergence | | | | | | | | | | | | | | | | | |
| Grid Cell Refinement (Increase # Grid Cells) | | Convergence Measure Target: value ≥2 | | | Comments | | | | | | | | | | | | |
| 64 - 128 | | 2.40 | | | Test officially passes the defined criteria | | | | | | | | | | | | |
| 128 - 256 | | 2.84 | | | Test officially passes the defined criteria | | | | | | | | | | | | |
| Bottom Line: Test passes the defined criteria with the 2nd order convergence ratio and the results are in the acceptable range of accuracy. | | | | | | | | | | | | | | | | | |