Test Data for Concentration Estimator

Emission source: (z0 is given for each test cases)

Receptor locations (x,y,z): (0,0,1m),(0,0,2m),(0,0,3m),(0,0,4m),(0,0,5m); (25m,0,1m),(25m,0,2m),(25m,0,3m),(25m,0,4m),(25m,0,5m); (50m,0,1m),(50m,0,2m),(50m,0,3m),(50m,0,4m),(50m,0,5m).

Wind direction: Along X axis.

Four test cases:

Case A:

Input: Gaussian turbulence, L = -15m, u\*=0.2 m, z0 = 0.01 m

Output of :

FWY estimator:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | H=1 | H=2 | H=3 | H=4 | H=5 |
| X=0 | 2.246412 | 0.446972 | 0.099741 | 0.021254 | 0.004429 |
| X=25 | 1.120568 | 0.662728 | 0.33682 | 0.154259 | 0.0732 |
| X=50 | 0.402233 | 0.323459 | 0.242438 | 0.17114 | 0.113544 |

New estimator:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | H=1 | H=2 | H=3 | H=4 | H=5 |
| X=0 | 2.586641 | 0.51799 | 0.116452 | 0.025424 | 0.005308 |
| X=25 | 1.276486 | 0.751762 | 0.384689 | 0.181248 | 0.086186 |
| X=50 | 0.45442 | 0.369452 | 0.274648 | 0.194787 | 0.131174 |

Case B:

Input: Gaussian turbulence, neutral stratification (L=), u\*=0.5 m, z0 = 0.01 m

Output of :

FWY estimator:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | H=1 | H=2 | H=3 | H=4 | H=5 |
| X=0 | 1.903484 | 0.703868 | 0.294933 | 0.08148 | 0.023889 |
| X=25 | 1.266834 | 1.034358 | 0.660366 | 0.358974 | 0.204579 |
| X=50 | 0.789848 | 0.616938 | 0.492489 | 0.41559 | 0.448164 |

New estimator:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | H=1 | H=2 | H=3 | H=4 | H=5 |
| X=0 | 2.028825 | 0.762978 | 0.280551 | 0.092361 | 0.020631 |
| X=25 | 1.339503 | 1.072836 | 0.668112 | 0.383127 | 0.221739 |
| X=50 | 0.812532 | 0.680259 | 0.525621 | 0.419184 | 0.313329 |

Case C:

Input: Bi-Gaussian turbulence, w\* = 1.1 m/s, u\* = 0.2 m/s, Zi = 1000 m, z0 = 0.01 m

Output of :

FWY estimator:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | H=1 | H=2 | H=3 | H=4 | H=5 |
| X=0 | 3.654346 | 1.333519 | 0.592311 | 0.274377 | 0.139484 |
| X=25 | 0.912417 | 0.686379 | 0.532558 | 0.395283 | 0.28656 |
| X=50 | 0.335404 | 0.250799 | 0.213755 | 0.193021 | 0.175881 |

New estimator:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | H=1 | H=2 | H=3 | H=4 | H=5 |
| X=0 | 3.324304 | 1.223289 | 0.540719 | 0.254201 | 0.127044 |
| X=25 | 0.831087 | 0.618865 | 0.486244 | 0.362904 | 0.262633 |
| X=50 | 0.301863 | 0.22926 | 0.194178 | 0.177253 | 0.159327 |

Case D:

Input: Bi-Gaussian turbulence with w\* = 2.0 m/s, u\* = 0.2 m/s, Zi = 1000 m, z0 = 0.01 m

Output of :

FWY estimator:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | H=1 | H=2 | H=3 | H=4 | H=5 |
| X=0 | 2.076217 | 0.902123 | 0.501054 | 0.31152 | 0.20409 |
| X=25 | 0.238213 | 0.189314 | 0.164623 | 0.152226 | 0.131384 |
| X=50 | 0.061167 | 0.055194 | 0.047454 | 0.04065 | 0.04036 |

New estimator:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | H=1 | H=2 | H=3 | H=4 | H=5 |
| X=0 | 1.870228 | 0.813114 | 0.454247 | 0.281724 | 0.182738 |
| X=25 | 0.215884 | 0.171469 | 0.149778 | 0.134849 | 0.117137 |
| X=50 | 0.055174 | 0.047769 | 0.041416 | 0.037545 | 0.036089 |