DNS DATABASE OF TURBULENT NATURAL CONVECTION IN HORIZONTAL FLUID LAYERS

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Case: Rayleigh-Benard convection of mercury, Ra = 3 000

Code number: RBC_mercury_3

Date of release: November 28, 1996

Date of revision: October 26, 1998

Computors: M. Bunk and M. Woerner
Forschungszentrum Karlsruhe GmbH
Institut fuer Reaktorsicherheit
Postfach 3640, D-76021 Karlsruhe, Germany

Parameter: Pr = 0.025, Ra = 3 000

Periodicity length: X_1 = X_2 = 8

Grid resolution: 128 * 128 * 39

Grid spacing: Delta x_1 = Delta x_2 = 0.0625, 0.01 <= Delta x_3 <= 0.04

Statistical averaging: 45 time planes, each 128 * 128 ensembles = 737 280 data

Nusselt number: 1.054

References: Bunk, M., Woerner, M.
Direkte numerische Simulation turbulenter
Rayleigh-Bénard-Konvektion in Quecksilber.
Forschungszentrum Karlsruhe, FZKA 5915, (1998).

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	x3 centered	u_mean	u_rms	v_mean	v_rms
1	.005000	.28981E-04	.11676E-01	-.46162E-04	.11791E-01
2	.015000	.86555E-04	.32695E-01	-.13936E-03	.33080E-01
3	.025500	.14530E-03	.52347E-01	-.24067E-03	.53053E-01
4	.037000	.20547E-03	.71184E-01	-.35957E-03	.72275E-01
5	.050000	.26435E-03	.89273E-01	-.50988E-03	.90833E-01
6	.065000	.31278E-03	.10629E+00	-.71074E-03	.10841E+00
7	.082000	.32858E-03	.12115E+00	-.97770E-03	.12393E+00
8	.101000	.27678E-03	.13306E+00	-.13183E-02	.13656E+00
9	.122000	.11342E-03	.14163E+00	-.17213E-02	.14590E+00
10	.145000	-.20186E-03	.14683E+00	-.21526E-02	.15189E+00
11	.170000	-.68921E-03	.14888E+00	-.25666E-02	.15473E+00
12	.197500	-.13577E-02	.14818E+00	-.29243E-02	.15479E+00
13	.228000	-.21860E-02	.14488E+00	-.32109E-02	.15219E+00
14	.262000	-.31263E-02	.13923E+00	-.34177E-02	.14712E+00
15	.300000	-.41179E-02	.13114E+00	-.35304E-02	.13949E+00
16	.340000	-.49697E-02	.12206E+00	-.35386E-02	.13060E+00
17	.380000	-.55505E-02	.11350E+00	-.34214E-02	.12194E+00
18	.420000	-.58788E-02	.10644E+00	-.31849E-02	.11442E+00
19	.460000	-.59728E-02	.10190E+00	-.28479E-02	.10895E+00
20	.500000	-.58694E-02	.10066E+00	-.24276E-02	.10631E+00
21	.540000	-.56073E-02	.10296E+00	-.19435E-02	.10695E+00
22	.580000	-.52329E-02	.10841E+00	-.14164E-02	.11089E+00
23	.620000	-.47939E-02	.11609E+00	-.87750E-03	.11759E+00
24	.660000	-.43297E-02	.12494E+00	-.36785E-03	.12620E+00

25	.700000	-.38363E-02	.13393E+00	.58682E-04	.13566E+00
26	.738000	-.33322E-02	.14160E+00	.33319E-03	.14423E+00
27	.772000	-.28471E-02	.14668E+00	.44954E-03	.15023E+00
28	.802500	-.23575E-02	.14936E+00	.45439E-03	.15368E+00
29	.830000	-.18785E-02	.14950E+00	.39709E-03	.15437E+00
30	.855000	-.14392E-02	.14696E+00	.31959E-03	.15214E+00
31	.878000	-.10630E-02	.14140E+00	.24248E-03	.14664E+00
32	.899000	-.76962E-03	.13255E+00	.17866E-03	.13765E+00
33	.918000	-.55695E-03	.12045E+00	.13017E-03	.12521E+00
34	.935000	-.40728E-03	.10548E+00	.94139E-04	.10976E+00
35	.950000	-.29946E-03	.88427E-01	.67084E-04	.92109E-01
36	.963000	-.21731E-03	.70386E-01	.46552E-04	.73387E-01
37	.974500	-.14902E-03	.51674E-01	.30373E-04	.53928E-01
38	.985000	-.87731E-04	.32221E-01	.17093E-04	.33659E-01
39	.995000	-.29308E-04	.11484E-01	.55393E-05	.12010E-01

	x3 stagg.	w_mean	w_rms
1	.010000	.24625E-06	.61347E-03
2	.020000	.19581E-06	.22896E-02
3	.031000	.20727E-06	.51806E-02
4	.043000	.18091E-06	.93755E-02
5	.057000	.13207E-06	.15363E-01
6	.073000	.16530E-06	.23287E-01
7	.091000	.22939E-06	.33140E-01
8	.111000	.19048E-06	.44778E-01
9	.133000	.17000E-06	.57943E-01
10	.157000	.18178E-06	.72313E-01
11	.183000	.18024E-06	.87532E-01
12	.212000	.18949E-06	.10377E+00
13	.244000	.18626E-06	.12049E+00
14	.280000	.18487E-06	.13754E+00
15	.320000	.18651E-06	.15395E+00
16	.360000	.18651E-06	.16740E+00
17	.400000	.18660E-06	.17769E+00
18	.440000	.18672E-06	.18468E+00
19	.480000	.18687E-06	.18825E+00
20	.520000	.18705E-06	.18836E+00
21	.560000	.18724E-06	.18499E+00
22	.600000	.18739E-06	.17821E+00
23	.640000	.18741E-06	.16809E+00
24	.680000	.18745E-06	.15479E+00
25	.720000	.18895E-06	.13845E+00
26	.756000	.18751E-06	.12140E+00
27	.788000	.18430E-06	.10462E+00
28	.817000	.19344E-06	.88298E-01
29	.843000	.19196E-06	.72966E-01
30	.867000	.20352E-06	.58470E-01
31	.889000	.18331E-06	.45180E-01
32	.909000	.14450E-06	.33428E-01
33	.927000	.20850E-06	.23479E-01
34	.943000	.24174E-06	.15481E-01
35	.957000	.19293E-06	.94417E-02
36	.969000	.16657E-06	.52140E-02
37	.980000	.17802E-06	.23030E-02
38	.990000	.24881E-06	.61658E-03

	x3 centered	p_mean	p_rms	T_mean	T_rms
1	.005000	-.12126E-04	.31474E-01	.99473E+00	.11466E-02
2	.015000	.48806E-02	.31199E-01	.98419E+00	.34405E-02
3	.025500	.98923E-02	.30924E-01	.97313E+00	.58506E-02
4	.037000	.15222E-01	.30632E-01	.96101E+00	.84921E-02
5	.050000	.21020E-01	.30306E-01	.94732E+00	.11478E-01
6	.065000	.27383E-01	.29927E-01	.93153E+00	.14919E-01
7	.082000	.34137E-01	.29497E-01	.91366E+00	.18804E-01

8	.101000	.41077E-01	.29034E-01	.89373E+00	.23110E-01
9	.122000	.47985E-01	.28586E-01	.87177E+00	.27801E-01
10	.145000	.54647E-01	.28236E-01	.84782E+00	.32821E-01
11	.170000	.60863E-01	.28093E-01	.82196E+00	.38096E-01
12	.197500	.66549E-01	.28281E-01	.79372E+00	.43614E-01
13	.228000	.71591E-01	.28937E-01	.76272E+00	.49333E-01
14	.262000	.75841E-01	.30143E-01	.72857E+00	.55117E-01
15	.300000	.79181E-01	.31887E-01	.69094E+00	.60778E-01
16	.340000	.81465E-01	.33932E-01	.65188E+00	.65840E-01
17	.380000	.82816E-01	.35840E-01	.61337E+00	.69820E-01
18	.420000	.83533E-01	.37378E-01	.57530E+00	.72680E-01
19	.460000	.83851E-01	.38374E-01	.53755E+00	.74397E-01
20	.500000	.83913E-01	.38730E-01	.49995E+00	.74961E-01
21	.540000	.83772E-01	.38411E-01	.46236E+00	.74371E-01
22	.580000	.83382E-01	.37453E-01	.42461E+00	.72630E-01
23	.620000	.82605E-01	.35955E-01	.38655E+00	.69751E-01
24	.660000	.81218E-01	.34085E-01	.34805E+00	.65758E-01
25	.700000	.78926E-01	.32069E-01	.30901E+00	.60690E-01
26	.738000	.75605E-01	.30332E-01	.27139E+00	.55027E-01
27	.772000	.71392E-01	.29105E-01	.23725E+00	.49246E-01
28	.802500	.66394E-01	.28409E-01	.20625E+00	.43533E-01
29	.830000	.60751E-01	.28173E-01	.17803E+00	.38022E-01
30	.855000	.54573E-01	.28270E-01	.15216E+00	.32755E-01
31	.878000	.47942E-01	.28584E-01	.12822E+00	.27743E-01
32	.899000	.41056E-01	.29005E-01	.10627E+00	.23060E-01
33	.918000	.34131E-01	.29450E-01	.86336E-01	.18763E-01
34	.935000	.27386E-01	.29869E-01	.68467E-01	.14886E-01
35	.950000	.21027E-01	.30242E-01	.52680E-01	.11452E-01
36	.963000	.15232E-01	.30566E-01	.38988E-01	.84729E-02
37	.974500	.99032E-02	.30857E-01	.26872E-01	.58374E-02
38	.985000	.48924E-02	.31131E-01	.15807E-01	.34327E-02
39	.995000	-.98857E-09	.31406E-01	.52692E-02	.11440E-02

	x3 centered	k	Epsilon	Epsilon_T	Reynolds_t	Peclet_t
1	.005000	.13863E-03	.28063E-01	.61059E-02	.26509E-03	.66273E-05
2	.015000	.10894E-02	.23770E-01	.61224E-02	.17397E-01	.43493E-03
3	.025500	.28018E-02	.19345E-01	.61519E-02	.14137E+00	.35342E-02
4	.037000	.52046E-02	.15613E-01	.61924E-02	.60432E+00	.15108E-01
5	.050000	.82398E-02	.12494E-01	.62426E-02	.18924E+01	.47310E-01
6	.065000	.11789E-01	.10046E-01	.62996E-02	.48176E+01	.12044E+00
7	.082000	.15518E-01	.82502E-02	.63544E-02	.10163E+02	.25407E+00
8	.101000	.19065E-01	.70519E-02	.63964E-02	.17944E+02	.44859E+00
9	.122000	.22143E-01	.62975E-02	.64151E-02	.27104E+02	.67761E+00
10	.145000	.24606E-01	.58082E-02	.64022E-02	.36284E+02	.90711E+00
11	.170000	.26441E-01	.54394E-02	.63452E-02	.44735E+02	.11184E+01
12	.197500	.27746E-01	.51039E-02	.62509E-02	.52497E+02	.13124E+01
13	.228000	.28595E-01	.47491E-02	.61243E-02	.59921E+02	.14980E+01
14	.262000	.29086E-01	.43777E-02	.59761E-02	.67257E+02	.16814E+01
15	.300000	.29164E-01	.39669E-02	.58731E-02	.74627E+02	.18657E+01
16	.340000	.29059E-01	.35209E-02	.57969E-02	.83477E+02	.20869E+01
17	.380000	.28923E-01	.31156E-02	.57196E-02	.93461E+02	.23365E+01
18	.420000	.28777E-01	.28182E-02	.56753E-02	.10231E+03	.25576E+01
19	.460000	.28656E-01	.26341E-02	.56564E-02	.10858E+03	.27146E+01
20	.500000	.28587E-01	.25801E-02	.56552E-02	.11037E+03	.27594E+01
21	.540000	.28586E-01	.26568E-02	.56676E-02	.10722E+03	.26804E+01
22	.580000	.28660E-01	.28574E-02	.56951E-02	.10023E+03	.25056E+01
23	.620000	.28797E-01	.31637E-02	.57437E-02	.91384E+02	.22846E+01
24	.660000	.28963E-01	.35740E-02	.58206E-02	.81800E+02	.20450E+01
25	.700000	.29123E-01	.40243E-02	.58921E-02	.73414E+02	.18353E+01
26	.738000	.29099E-01	.44391E-02	.59879E-02	.66403E+02	.16601E+01
27	.772000	.28641E-01	.48170E-02	.61281E-02	.59249E+02	.14812E+01
28	.802500	.27805E-01	.51826E-02	.62468E-02	.51883E+02	.12971E+01
29	.830000	.26503E-01	.55281E-02	.63341E-02	.44185E+02	.11046E+01
30	.855000	.24671E-01	.59019E-02	.63849E-02	.35858E+02	.89645E+00

31	.878000	.22210E-01	.63898E-02	.63926E-02	.26842E+02	.67105E+00
32	.899000	.19129E-01	.71388E-02	.63698E-02	.17822E+02	.44555E+00
33	.918000	.15575E-01	.83328E-02	.63248E-02	.10121E+02	.25301E+00
34	.935000	.11833E-01	.10128E-01	.62677E-02	.48059E+01	.12015E+00
35	.950000	.82680E-02	.12579E-01	.62092E-02	.18894E+01	.47234E-01
36	.963000	.52203E-02	.15699E-01	.61582E-02	.60354E+00	.15089E-01
37	.974500	.28087E-02	.19427E-01	.61171E-02	.14120E+00	.35301E-02
38	.985000	.10914E-02	.23839E-01	.60874E-02	.17377E-01	.43443E-03
39	.995000	.13876E-03	.28133E-01	.60708E-02	.25570E-03	.63926E-05