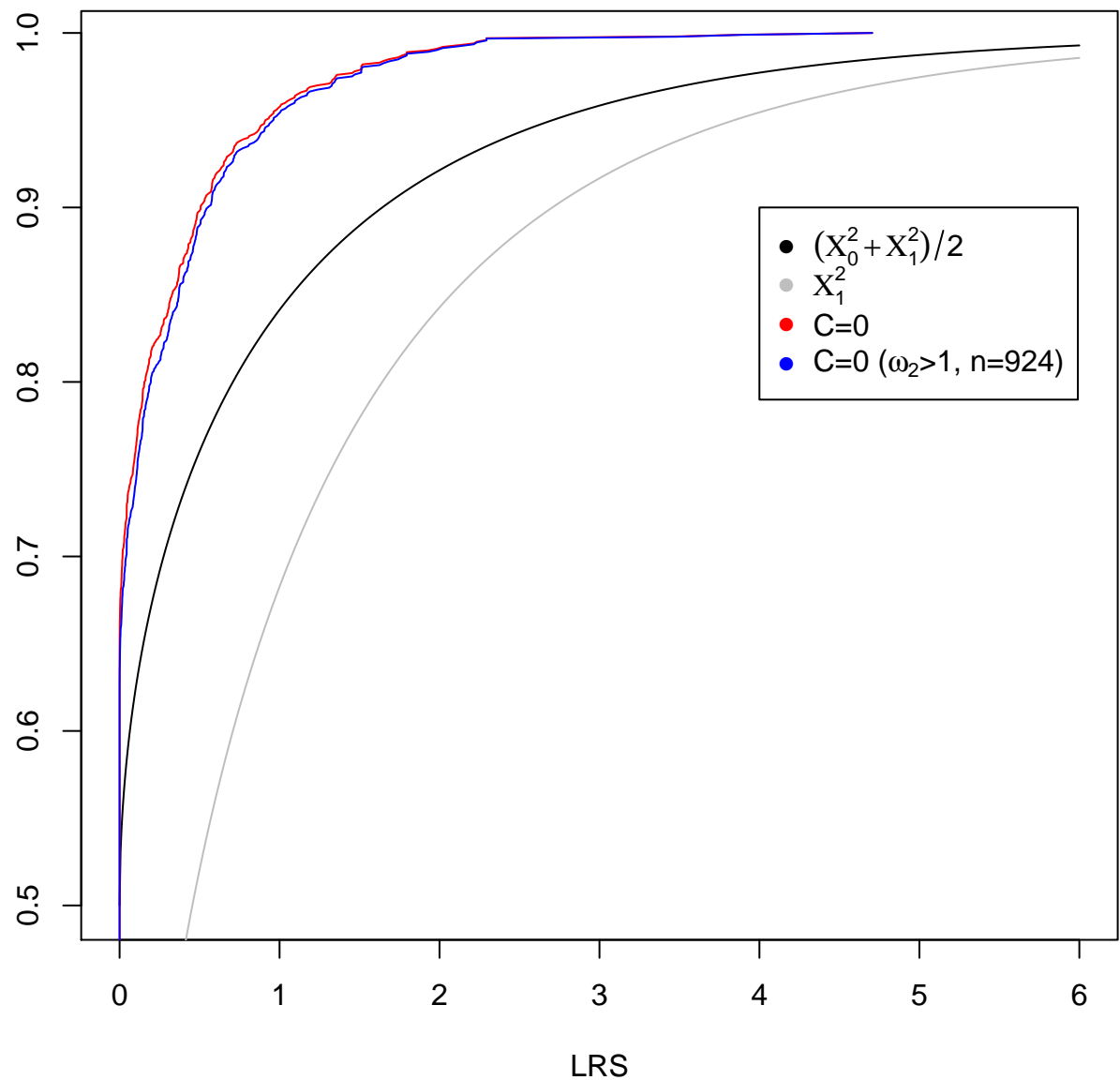
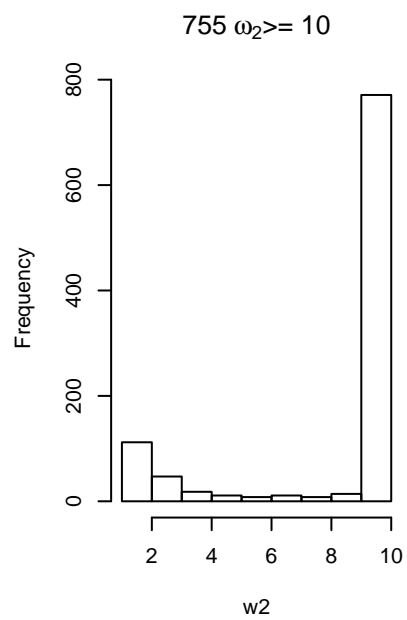
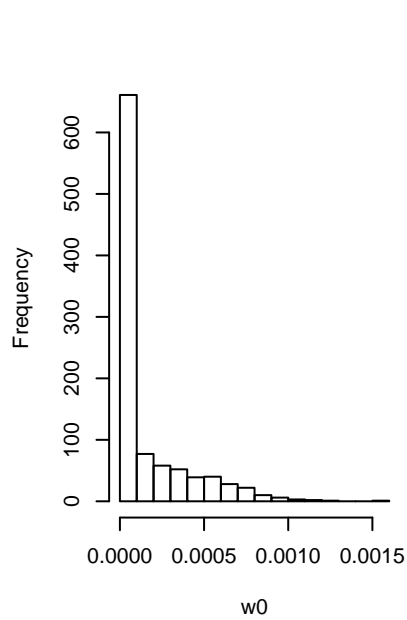
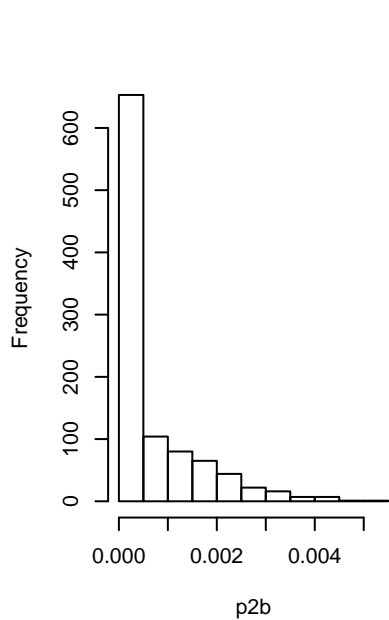
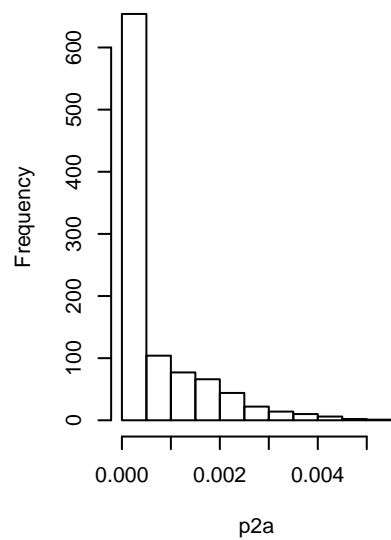
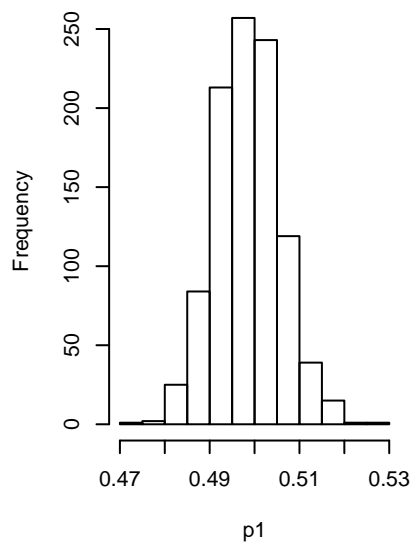
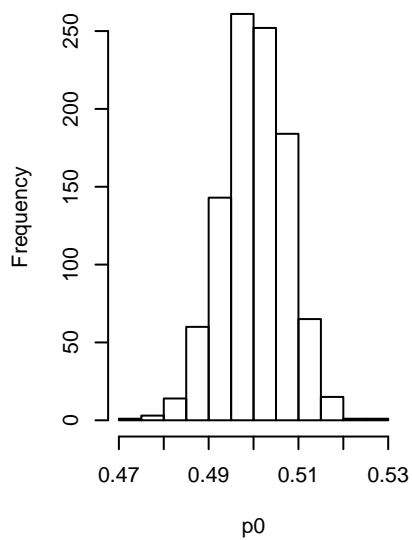


- Simulation under the null for branch-site model A
- Symmetric (ignoring branch lengths), 8-taxon tree with one foreground branch  
The total tree length is 6 (3 in other sims) and the foreground branch is 10x the length of the background branches.  
tree: (((A#1:2.6087,B:0.26087):0.26087,(C:0.26087,D:0.26087):0.26087):0.26087,  
((E:0.26087,F:0.26087):0.26087,(G:0.26087,H:0.26087):0.26087):0.26087);
- $\kappa = 2.0$   $p_0 = 0.5$   $p_1 = 0.5$   $\omega_0 = 0$





problems with optimization?

sort(lrt0)

[1]	-2.063474e+00	-1.859498e+00	-1.856714e+00	-1.162714e+00	-1.098460e+00
[6]	-9.815880e-01	-9.346020e-01	-8.952120e-01	-8.493040e-01	-8.076140e-01
[11]	-8.051600e-01	-7.864480e-01	-7.818100e-01	-7.740920e-01	-6.264380e-01
[16]	-5.944820e-01	-5.435340e-01	-5.276660e-01	-5.126460e-01	-5.052120e-01
[21]	-4.825460e-01	-4.818800e-01	-4.816840e-01	-4.743980e-01	-4.649020e-01
[26]	-4.556680e-01	-4.306300e-01	-4.231420e-01	-4.022940e-01	-3.967780e-01
[31]	-3.945780e-01	-3.766060e-01	-3.545960e-01	-3.476920e-01	-3.235540e-01
[36]	-3.023840e-01	-2.971800e-01	-2.872700e-01	-2.867760e-01	-2.839780e-01
[41]	-2.823060e-01	-2.748940e-01	-2.716680e-01	-2.622980e-01	-2.384320e-01
[46]	-2.374360e-01	-2.324040e-01	-2.223520e-01	-2.213180e-01	-2.203420e-01
[51]	-2.093220e-01	-2.019100e-01	-1.945140e-01	-1.740420e-01	-1.728900e-01
[56]	-1.702300e-01	-1.664020e-01	-1.660820e-01	-1.644360e-01	-1.592300e-01
[61]	-1.540200e-01	-1.465380e-01	-1.393960e-01	-1.370740e-01	-1.341000e-01
[66]	-1.302700e-01	-1.232140e-01	-1.229260e-01	-1.164680e-01	-1.147480e-01
[71]	-1.076720e-01	-1.020200e-01	-9.362800e-02	-8.968800e-02	-8.853800e-02
[76]	-8.779600e-02	-8.682600e-02	-7.293400e-02	-7.288400e-02	-7.222400e-02
[81]	-7.100400e-02	-6.942000e-02	-6.791000e-02	-5.856400e-02	-5.661200e-02
[86]	-5.465200e-02	-5.232600e-02	-5.178800e-02	-4.916400e-02	-4.702400e-02
[91]	-4.441000e-02	-4.344600e-02	-4.028800e-02	-3.943000e-02	-3.927200e-02
[96]	-3.790000e-02	-3.464600e-02	-3.381200e-02	-3.305400e-02	-3.277800e-02
[101]	-3.091600e-02	-3.042600e-02	-2.958600e-02	-2.779800e-02	-2.556200e-02
[106]	-2.131600e-02	-2.086800e-02	-1.969000e-02	-1.801800e-02	-1.798800e-02
[111]	-1.790600e-02	-1.683600e-02	-1.537400e-02	-1.513800e-02	-1.467600e-02
[116]	-1.425600e-02	-1.390400e-02	-1.230200e-02	-1.223600e-02	-1.221400e-02
[121]	-1.202400e-02	-1.180000e-02	-1.140200e-02	-1.080200e-02	-1.077400e-02
[126]	-1.059000e-02	-1.037600e-02	-1.025800e-02	-1.019800e-02	-9.560000e-03
[131]	-9.012000e-03	-8.826000e-03	-8.650000e-03	-8.626000e-03	-8.556000e-03
[136]	-8.420000e-03	-8.302000e-03	-8.170000e-03	-8.144000e-03	-7.790000e-03
[141]	-7.674000e-03	-7.554000e-03	-7.148000e-03	-7.112000e-03	-7.090000e-03
[146]	-6.890000e-03	-6.668000e-03	-6.554000e-03	-6.526000e-03	-6.242000e-03
[151]	-5.830000e-03	-5.826000e-03	-5.726000e-03	-5.662000e-03	-5.262000e-03
[156]	-5.208000e-03	-5.094000e-03	-5.018000e-03	-4.878000e-03	-4.730000e-03
[161]	-4.628000e-03	-4.498000e-03	-4.492000e-03	-4.450000e-03	-4.394000e-03
[166]	-4.376000e-03	-4.322000e-03	-4.274000e-03	-4.244000e-03	-4.176000e-03
[171]	-4.134000e-03	-4.128000e-03	-4.078000e-03	-4.048000e-03	-3.784000e-03
[176]	-3.736000e-03	-3.668000e-03	-3.644000e-03	-3.518000e-03	-3.306000e-03
[181]	-3.258000e-03	-3.230000e-03	-3.158000e-03	-3.140000e-03	-3.066000e-03
[186]	-3.054000e-03	-3.048000e-03	-2.870000e-03	-2.844000e-03	-2.812000e-03
[191]	-2.746000e-03	-2.736000e-03	-2.728000e-03	-2.722000e-03	-2.698000e-03
[196]	-2.698000e-03	-2.682000e-03	-2.588000e-03	-2.542000e-03	-2.510000e-03
[201]	-2.476000e-03	-2.442000e-03	-2.352000e-03	-2.342000e-03	-2.330000e-03
[206]	-2.238000e-03	-2.236000e-03	-2.214000e-03	-2.206000e-03	-2.198000e-03
[211]	-2.182000e-03	-2.178000e-03	-2.160000e-03	-2.156000e-03	-2.148000e-03
[216]	-2.098000e-03	-2.070000e-03	-2.056000e-03	-2.050000e-03	-2.046000e-03
[221]	-2.040000e-03	-2.040000e-03	-2.036000e-03	-2.034000e-03	-2.020000e-03
[226]	-2.008000e-03	-1.950000e-03	-1.896000e-03	-1.886000e-03	-1.858000e-03
[231]	-1.846000e-03	-1.836000e-03	-1.832000e-03	-1.824000e-03	-1.754000e-03
[236]	-1.716000e-03	-1.716000e-03	-1.678000e-03	-1.672000e-03	-1.672000e-03
[241]	-1.642000e-03	-1.624000e-03	-1.616000e-03	-1.604000e-03	-1.596000e-03

[246]	-1.566000e-03	-1.560000e-03	-1.560000e-03	-1.536000e-03	-1.534000e-03
[251]	-1.522000e-03	-1.510000e-03	-1.458000e-03	-1.450000e-03	-1.448000e-03
[256]	-1.448000e-03	-1.442000e-03	-1.440000e-03	-1.438000e-03	-1.420000e-03
[261]	-1.420000e-03	-1.408000e-03	-1.404000e-03	-1.396000e-03	-1.394000e-03
[266]	-1.358000e-03	-1.352000e-03	-1.346000e-03	-1.342000e-03	-1.340000e-03
[271]	-1.328000e-03	-1.308000e-03	-1.278000e-03	-1.268000e-03	-1.260000e-03
[276]	-1.230000e-03	-1.194000e-03	-1.182000e-03	-1.182000e-03	-1.178000e-03
[281]	-1.172000e-03	-1.160000e-03	-1.160000e-03	-1.154000e-03	-1.150000e-03
[286]	-1.148000e-03	-1.146000e-03	-1.140000e-03	-1.136000e-03	-1.132000e-03
[291]	-1.116000e-03	-1.082000e-03	-1.076000e-03	-1.072000e-03	-1.060000e-03
[296]	-1.046000e-03	-1.026000e-03	-1.024000e-03	-1.016000e-03	-9.960000e-04
[301]	-9.920000e-04	-9.780000e-04	-9.720000e-04	-9.640000e-04	-9.420000e-04
[306]	-9.380000e-04	-9.320000e-04	-9.020000e-04	-8.980000e-04	-8.980000e-04
[311]	-8.780000e-04	-8.740000e-04	-8.640000e-04	-8.520000e-04	-8.280000e-04
[316]	-8.200000e-04	-8.160000e-04	-8.140000e-04	-7.940000e-04	-7.900000e-04
[321]	-7.880000e-04	-7.880000e-04	-7.820000e-04	-7.800000e-04	-7.720000e-04
[326]	-7.320000e-04	-7.300000e-04	-7.240000e-04	-7.180000e-04	-7.140000e-04
[331]	-7.040000e-04	-6.980000e-04	-6.940000e-04	-6.900000e-04	-6.760000e-04
[336]	-6.520000e-04	-6.400000e-04	-6.380000e-04	-6.340000e-04	-6.120000e-04
[341]	-6.060000e-04	-6.020000e-04	-6.000000e-04	-5.980000e-04	-5.900000e-04
[346]	-5.780000e-04	-5.740000e-04	-5.700000e-04	-5.620000e-04	-5.520000e-04
[351]	-5.460000e-04	-5.420000e-04	-5.420000e-04	-5.400000e-04	-5.360000e-04
[356]	-5.240000e-04	-5.060000e-04	-5.060000e-04	-4.940000e-04	-4.920000e-04
[361]	-4.920000e-04	-4.900000e-04	-4.880000e-04	-4.860000e-04	-4.840000e-04
[366]	-4.800000e-04	-4.500000e-04	-4.480000e-04	-4.460000e-04	-4.420000e-04
[371]	-4.420000e-04	-4.400000e-04	-4.400000e-04	-4.260000e-04	-4.180000e-04
[376]	-4.080000e-04	-3.820000e-04	-3.800000e-04	-3.700000e-04	-3.640000e-04
[381]	-3.540000e-04	-3.360000e-04	-3.360000e-04	-3.260000e-04	-3.220000e-04
[386]	-3.220000e-04	-3.140000e-04	-3.140000e-04	-3.100000e-04	-3.000000e-04
[391]	-2.940000e-04	-2.880000e-04	-2.880000e-04	-2.840000e-04	-2.720000e-04
[396]	-2.660000e-04	-2.640000e-04	-2.600000e-04	-2.600000e-04	-2.600000e-04
[401]	-2.580000e-04	-2.540000e-04	-2.520000e-04	-2.520000e-04	-2.360000e-04
[406]	-2.300000e-04	-2.280000e-04	-2.120000e-04	-2.080000e-04	-2.000000e-04
[411]	-1.700000e-04	-1.660000e-04	-1.660000e-04	-1.620000e-04	-1.580000e-04
[416]	-1.560000e-04	-1.560000e-04	-1.520000e-04	-1.400000e-04	-1.360000e-04
[421]	-1.340000e-04	-1.320000e-04	-1.320000e-04	-1.280000e-04	-1.240000e-04
[426]	-1.200000e-04	-1.200000e-04	-1.200000e-04	-1.180000e-04	-1.140000e-04
[431]	-1.120000e-04	-1.100000e-04	-1.100000e-04	-1.080000e-04	-1.040000e-04
[436]	-1.020000e-04	-9.800002e-05	-9.800002e-05	-9.400002e-05	-9.400002e-05
[441]	-9.399999e-05	-9.399999e-05	-9.200000e-05	-9.200000e-05	-8.999999e-05
[446]	-8.600001e-05	-8.600001e-05	-7.799998e-05	-6.999998e-05	-5.800001e-05
[451]	-5.799998e-05	-5.400000e-05	-5.400000e-05	-5.200002e-05	-5.199999e-05
[456]	-5.199999e-05	-4.600000e-05	-3.800000e-05	-3.600001e-05	-3.600001e-05
[461]	-3.600001e-05	-3.200001e-05	-2.599999e-05	-2.400001e-05	-2.400001e-05
[466]	-2.400001e-05	-2.000001e-05	-1.600001e-05	-1.399999e-05	-1.200000e-05
[471]	-1.200000e-05	-1.000002e-05	-8.000003e-06	-8.000003e-06	-5.999987e-06
[476]	-5.999987e-06	-5.999987e-06	-4.000001e-06	-4.000001e-06	-4.000001e-06
[481]	-4.000001e-06	-4.000001e-06	-4.000001e-06	-2.000015e-06	-2.000015e-06
[486]	-2.000015e-06	-2.000015e-06	-2.000015e-06	-2.000015e-06	-2.000015e-06
[491]	-2.000015e-06	-2.000015e-06	-2.000015e-06	-2.000015e-06	-2.000015e-06
[496]	-1.999986e-06	-1.999986e-06	-1.999986e-06	-1.999986e-06	-1.999986e-06
[501]	-1.999986e-06	-1.999986e-06	-1.999986e-06	-1.999986e-06	-1.999986e-06

[506]	-1.999986e-06	-1.999986e-06	0.000000e+00	0.000000e+00	0.000000e+00
[511]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[516]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[521]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[526]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[531]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[536]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[541]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[546]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[551]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[556]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[561]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[566]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[571]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[576]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[581]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[586]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[591]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[596]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[601]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[606]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[611]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[616]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[621]	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
[626]	0.000000e+00	0.000000e+00	0.000000e+00	1.999986e-06	1.999986e-06
[631]	1.999986e-06	1.999986e-06	1.999986e-06	1.999986e-06	2.000015e-06
[636]	2.000015e-06	2.000015e-06	2.000015e-06	2.000015e-06	2.000015e-06
[641]	4.000001e-06	4.000001e-06	2.799998e-05	3.999998e-05	5.000000e-05
[646]	6.200001e-05	6.399999e-05	8.599999e-05	9.599997e-05	1.120000e-04
[651]	1.600000e-04	2.840000e-04	4.260000e-04	4.600000e-04	4.880000e-04
[656]	5.040000e-04	8.980000e-04	9.220000e-04	9.820000e-04	1.116000e-03
[661]	1.386000e-03	1.414000e-03	1.456000e-03	1.966000e-03	2.194000e-03
[666]	2.286000e-03	2.426000e-03	2.432000e-03	2.766000e-03	2.850000e-03
[671]	3.254000e-03	3.482000e-03	3.826000e-03	4.038000e-03	4.058000e-03
[676]	4.734000e-03	5.684000e-03	5.772000e-03	5.952000e-03	6.380000e-03
[681]	7.260000e-03	9.364000e-03	1.036000e-02	1.058200e-02	1.146600e-02
[686]	1.165600e-02	1.171800e-02	1.245800e-02	1.272200e-02	1.288600e-02
[691]	1.351400e-02	1.361000e-02	1.456800e-02	1.507200e-02	1.584600e-02
[696]	1.631400e-02	1.632800e-02	1.673000e-02	1.821000e-02	1.843600e-02
[701]	1.879600e-02	1.931200e-02	1.960400e-02	2.043600e-02	2.444200e-02
[706]	2.598800e-02	2.614000e-02	2.806400e-02	2.878200e-02	2.905400e-02
[711]	2.920600e-02	2.963200e-02	3.257400e-02	3.293000e-02	3.312800e-02
[716]	3.577400e-02	3.580600e-02	3.622200e-02	3.695000e-02	3.960400e-02
[721]	4.127200e-02	4.405200e-02	4.406200e-02	4.412200e-02	4.443800e-02
[726]	4.455200e-02	4.462800e-02	4.470000e-02	4.490000e-02	4.490400e-02
[731]	4.852000e-02	4.926400e-02	5.029600e-02	5.056800e-02	5.072600e-02
[736]	5.235000e-02	5.359400e-02	5.788200e-02	5.921800e-02	6.088800e-02
[741]	6.274800e-02	6.816000e-02	6.876800e-02	6.993400e-02	7.254000e-02
[746]	7.717400e-02	8.197600e-02	8.283200e-02	8.354000e-02	8.506800e-02
[751]	8.518800e-02	8.742800e-02	8.836200e-02	9.072000e-02	9.189600e-02
[756]	9.333400e-02	9.455000e-02	9.529400e-02	9.707000e-02	9.957800e-02
[761]	9.984800e-02	1.008780e-01	1.023380e-01	1.044460e-01	1.047540e-01

[766]	1.064300e-01	1.077540e-01	1.081840e-01	1.102700e-01	1.109160e-01
[771]	1.118480e-01	1.119680e-01	1.120360e-01	1.139260e-01	1.151700e-01
[776]	1.178220e-01	1.181320e-01	1.211460e-01	1.228360e-01	1.249740e-01
[781]	1.251480e-01	1.284760e-01	1.299800e-01	1.307300e-01	1.363420e-01
[786]	1.382980e-01	1.396400e-01	1.402980e-01	1.424540e-01	1.439080e-01
[791]	1.439300e-01	1.441860e-01	1.442140e-01	1.451560e-01	1.456480e-01
[796]	1.462220e-01	1.527780e-01	1.528140e-01	1.542460e-01	1.548760e-01
[801]	1.618760e-01	1.620320e-01	1.634080e-01	1.659480e-01	1.684180e-01
[806]	1.718800e-01	1.751920e-01	1.771520e-01	1.779420e-01	1.823060e-01
[811]	1.839420e-01	1.849400e-01	1.850400e-01	1.909280e-01	1.950920e-01
[816]	1.957820e-01	1.964760e-01	1.980280e-01	2.022920e-01	2.039640e-01
[821]	2.138020e-01	2.156420e-01	2.248800e-01	2.293360e-01	2.406040e-01
[826]	2.462940e-01	2.560840e-01	2.561380e-01	2.574860e-01	2.611660e-01
[831]	2.618460e-01	2.670500e-01	2.741480e-01	2.749520e-01	2.764600e-01
[836]	2.776720e-01	2.907000e-01	2.964020e-01	2.973540e-01	3.023100e-01
[841]	3.024700e-01	3.064740e-01	3.089620e-01	3.097520e-01	3.104240e-01
[846]	3.136560e-01	3.171600e-01	3.189060e-01	3.252920e-01	3.271800e-01
[851]	3.323580e-01	3.326100e-01	3.430140e-01	3.502000e-01	3.569480e-01
[856]	3.597860e-01	3.599540e-01	3.655700e-01	3.661360e-01	3.685980e-01
[861]	3.698260e-01	3.705620e-01	3.721760e-01	3.726820e-01	3.727540e-01
[866]	3.762020e-01	3.803500e-01	3.973700e-01	3.982600e-01	3.983460e-01
[871]	4.009100e-01	4.059020e-01	4.108920e-01	4.222340e-01	4.222540e-01
[876]	4.270200e-01	4.294620e-01	4.297620e-01	4.301000e-01	4.427020e-01
[881]	4.435180e-01	4.461620e-01	4.513920e-01	4.574420e-01	4.581080e-01
[886]	4.603420e-01	4.609800e-01	4.660080e-01	4.688400e-01	4.714340e-01
[891]	4.756540e-01	4.759520e-01	4.807680e-01	4.819220e-01	4.833280e-01
[896]	4.847200e-01	4.871020e-01	4.989340e-01	5.063760e-01	5.069160e-01
[901]	5.074700e-01	5.170060e-01	5.254520e-01	5.318920e-01	5.322160e-01
[906]	5.383620e-01	5.432540e-01	5.560760e-01	5.716680e-01	5.729080e-01
[911]	5.758280e-01	5.772880e-01	5.780660e-01	5.785280e-01	5.813560e-01
[916]	5.838620e-01	5.939900e-01	5.960220e-01	6.015500e-01	6.096800e-01
[921]	6.228040e-01	6.319340e-01	6.370480e-01	6.498120e-01	6.514840e-01
[926]	6.521880e-01	6.610420e-01	6.669980e-01	6.701520e-01	6.861220e-01
[931]	6.987420e-01	7.094040e-01	7.101480e-01	7.158600e-01	7.169380e-01
[936]	7.268260e-01	7.324880e-01	7.498220e-01	7.717700e-01	8.042720e-01
[941]	8.105240e-01	8.395020e-01	8.559160e-01	8.660800e-01	8.724540e-01
[946]	8.781900e-01	8.839640e-01	9.045920e-01	9.060220e-01	9.111880e-01
[951]	9.320260e-01	9.368100e-01	9.502120e-01	9.624580e-01	9.631360e-01
[956]	9.815940e-01	9.916920e-01	1.004234e+00	1.010678e+00	1.036750e+00
[961]	1.049510e+00	1.069484e+00	1.094912e+00	1.096414e+00	1.114758e+00
[966]	1.134312e+00	1.171108e+00	1.173870e+00	1.189864e+00	1.238298e+00
[971]	1.310530e+00	1.325722e+00	1.329224e+00	1.343990e+00	1.349238e+00
[976]	1.358976e+00	1.453370e+00	1.469516e+00	1.511118e+00	1.511164e+00
[981]	1.511174e+00	1.519062e+00	1.625734e+00	1.650690e+00	1.686244e+00
[986]	1.741174e+00	1.764860e+00	1.794262e+00	1.795802e+00	1.930170e+00
[991]	1.985606e+00	2.019860e+00	2.122912e+00	2.214294e+00	2.233642e+00
[996]	2.293482e+00	2.293848e+00	3.483950e+00	3.892592e+00	4.705686e+00