

# Kenya

## [1] "Census Females"

## # A tibble: 18 x 8

##	aggr.age	`1962`	`1969`	`1979`	`1989`	`1999`	`2009`	`2019`
##	*	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
## 1	0	705064.	1046380	1423936.	1891568.	2256516.	2940322.	2978323.
## 2	5	597154.	874226.	1235895.	1708725.	2055280.	2735980.	3064593.
## 3	10	477386.	691456.	1046913.	1476419.	1934383.	2438712.	2977774.
## 4	15	395882.	550900.	872886.	1226523.	1748105.	2146642.	2652670.
## 5	20	367906.	464071.	701504.	1019471.	1482544.	1940959.	2304416.
## 6	25	336176.	392957.	546283.	821903.	1176768.	1657743.	2043947.
## 7	30	272548.	318636.	423762.	615387.	900106.	1300974.	1753184.
## 8	35	208542.	257704.	334882.	464691.	706673.	1001392.	1385454.
## 9	40	161280.	208136.	274175.	370261.	547466.	777107.	1087393.
## 10	45	124664.	167178.	227571.	298181.	426343.	621651.	866858.
## 11	50	92140.	136058.	184967.	239216.	335929.	486662.	679125.
## 12	55	67382.	109512.	142658.	192942.	258435.	370542.	556669.
## 13	60	53409.	88640.	109394.	158686.	207777.	289461.	452658.
## 14	65	39397.	66777.	84777.	123427.	168755.	223312.	354144.
## 15	70	26466.	45690.	62651.	90086.	129033.	171156.	265847.
## 16	75	17945.	30620.	86752.	60564.	82113.	118734.	181084.
## 17	80	14141.	21530	NA	94209.	121769.	224687.	118391.
## 18	85	17121.	26621	NA	NA	NA	NA	141785.

## [1] "Census Males"

## # A tibble: 18 x 8

##	aggr.age	`1962`	`1969`	`1979`	`1989`	`1999`	`2009`	`2019`
##	*	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
## 1	0	680883.	1058102	1424953.	1914189.	2308755.	3002234.	2997631.
## 2	5	609628.	901502.	1244344.	1728441.	2097298.	2809453.	3102097.
## 3	10	513677.	726541.	1052936.	1484869.	1952354.	2523246.	3040190.
## 4	15	386214.	565756.	851898.	1189315.	1694212.	2142963.	2651859.
## 5	20	289232.	441444.	664211.	936316.	1368457.	1791316.	2159206.
## 6	25	250085.	352038.	519992.	760638.	1097757.	1518251.	1840199.
## 7	30	221413.	290906.	404695.	604081.	874258.	1262642.	1615620.
## 8	35	189179.	244789.	312473.	470056.	691971.	1002938.	1362683.
## 9	40	162241.	203129.	258557.	370463.	540968.	782174.	1125199.
## 10	45	137093.	167854.	221009.	291860.	428326.	623496.	898890.
## 11	50	107131.	138027.	181751.	233257.	335648.	488150.	687325.
## 12	55	81154.	116068.	143338.	186345.	248443.	373342.	537408.
## 13	60	64459.	98553.	114261.	148130.	189804.	283422.	419991.
## 14	65	47331.	75013.	93665.	114381.	149855.	205573.	316734.
## 15	70	33717.	50794.	66506.	86192.	115173.	150987.	223830.
## 16	75	24812.	33529.	87947.	66706.	79747.	99893.	138307.
## 17	80	20104.	22078	NA	82347.	95999.	159220.	81682.
## 18	85	25148.	29194	NA	NA	NA	NA	83593.

Thiele Normal Hump

##	user	system	elapsed
##	109.31	2.12	112.13

```
## [1] "relative convergence (4)"
```

### Thiele log-Normal Hump

```
## user system elapsed
## 113.47 1.89 116.32
```

```
## [1] "relative convergence (4)"
```

### Thiele log-Normal Hump RW

```
## Order of parameters:
```

## [1] "log_tau2_logpop_f"	"log_tau2_logpop_m"	"log_tau2_fx"	"log_tau2_gx_f"
## [5] "log_tau2_gx_m"	"log_basepop_f"	"log_basepop_m"	"log_fx"
## [9] "gx_f"	"gx_m"	"logit_rho_g_x_f"	"logit_rho_g_t_f"
## [13] "logit_rho_g_t_f"	"logit_rho_g_t_m"	"log_lambda_tp"	"log_lambda_tp"
## [17] "tp_params"	"log_dispersion_f"	"log_dispersion_m"	"log_phi_f"
## [21] "log_phi_innov_m"	"log_psi_innov_f"	"log_psi_innov_m"	"log_lambda_f"
## [25] "log_lambda_innov_m"	"log_delta_innov_f"	"log_delta_innov_m"	"log_epsilon_f"
## [29] "log_epsilon_innov_m"	"log_A_innov_f"	"log_A_innov_m"	"log_B_f"
## [33] "log_B_innov_m"	"log_phi_f"	"log_phi_m"	"log_psi_f"
## [37] "log_psi_m"	"log_lambda_f"	"log_lambda_m"	"log_delta_f"
## [41] "log_delta_m"	"log_epsilon_f"	"log_epsilon_m"	"log_A_f"
## [45] "log_A_m"	"log_B_f"	"log_B_m"	"log_marginal_prec_phi_f"
## [49] "log_marginal_prec_phi_m"	"log_marginal_prec_psi_f"	"log_marginal_prec_psi_m"	"log_marginal_prec_lambda_f"
## [53] "log_marginal_prec_lambda_m"	"log_marginal_prec_delta_f"	"log_marginal_prec_delta_m"	"log_marginal_prec_A_f"
## [57] "log_marginal_prec_epsilon_m"	"log_marginal_prec_A_f"	"log_marginal_prec_A_m"	"logit_rho_phi_f"
## [61] "log_marginal_prec_B_m"	"logit_rho_phi_f"	"logit_rho_phi_m"	"logit_rho_lambda_f"
## [65] "logit_rho_psi_m"	"logit_rho_lambda_f"	"logit_rho_lambda_m"	"logit_rho_epsilon_f"
## [69] "logit_rho_delta_m"	"logit_rho_epsilon_f"	"logit_rho_epsilon_m"	"logit_rho_B_f"
## [73] "logit_rho_A_m"	"logit_rho_B_f"	"logit_rho_B_m"	

```
## Not matching template order:
```

## [1] "log_tau2_logpop_f"	"log_tau2_logpop_m"	"log_tau2_fx"	"log_tau2_gx_f"
## [5] "log_tau2_gx_m"	"logit_rho_g_x_f"	"logit_rho_g_t_f"	"log_fx"
## [9] "logit_rho_g_t_m"	"log_basepop_f"	"log_basepop_m"	"log_lambda_tp"
## [13] "gx_f"	"gx_m"	"log_lambda_tp"	"tp_params"
## [17] "log_dispersion_f"	"log_dispersion_m"	"tp_params"	"log_phi_f"
## [21] "log_psi_f"	"log_lambda_f"	"log_delta_f"	"log_epsilon_f"
## [25] "log_A_f"	"log_B_f"	"log_phi_m"	"log_psi_f"
## [29] "log_lambda_m"	"log_delta_m"	"log_epsilon_m"	"log_A_m"
## [33] "log_B_m"	"log_marginal_prec_phi_f"	"log_marginal_prec_psi_f"	"log_marginal_prec_lambda_f"
## [37] "log_marginal_prec_delta_f"	"log_marginal_prec_epsilon_f"	"log_marginal_prec_A_f"	"log_marginal_prec_B_m"
## [41] "log_marginal_prec_phi_m"	"log_marginal_prec_psi_m"	"log_marginal_prec_lambda_m"	"logit_rho_psi_f"
## [45] "log_marginal_prec_epsilon_m"	"log_marginal_prec_A_m"	"log_marginal_prec_B_m"	"logit_rho_A_f"
## [49] "logit_rho_psi_f"	"logit_rho_A_f"	"logit_rho_B_f"	"logit_rho_B_m"
## [53] "logit_rho_psi_m"	"logit_rho_A_m"	"logit_rho_B_m"	

```
## Your parameter list has been re-ordered.
```

```
## (Disable this warning with checkParameterOrder=FALSE)
```

```
## Constructing atomic D_lgamma
```

```
## Constructing atomic D_lgamma
```

```
## Constructing atomic D_lgamma
```

```
## Optimizing tape... Done
```

```
## iter: 1 value: 3210.532 mgc: 212.1476 ustep: 0.008923143
```

```
## iter: 2 value: 2817.899 mgc: 94.56741 ustep: 0.01233532
```

```
## iter: 3 value: 2705.049 mgc: 70.92418 ustep: 0.1111534
```

```
## iter: 4 value: 2282.262 mgc: 1366.991 ustep: 0.002400765
```

```
## iter: 5 value: 2158.305 mgc: 321.7804 ustep: 0.02485276
```

```
## iter: 6 value: 2103.891 mgc: 84.65199 ustep: 0.04199792
```

```
## iter: 7 value: 2072.729 mgc: 55.70299 ustep: 0.108369
```

```

## iter: 8 value: 2065.102 mgc: 64.91551 ustep: 0.3292615
## iter: 9 value: 2058.161 mgc: 167.5876 ustep: 0.5738558
## iter: 10 value: 2050.171 mgc: 66.40276 ustep: 0.1622681
## iter: 11 value: 2049.158 mgc: 13.63624 ustep: 0.4028849
## iter: 12 value: 2049.074 mgc: 5.33198 ustep: 0.6347686
## iter: 13 value: 2049.07 mgc: 0.1632979 ustep: 0.796744
## iter: 14 value: 2049.07 mgc: 0.02589453 ustep: 0.8926159
## iter: 15 value: 2049.07 mgc: 0.002461471 ustep: 0.9447891
## iter: 16 value: 2049.07 mgc: 0.0001325522 ustep: 0.9720054
## iter: 17 value: 2049.07 mgc: 6.453704e-06 ustep: 0.9859048
## iter: 18 value: 2049.07 mgc: 2.668847e-07 ustep: 0.9929281
## iter: 19 mgc: 5.606397e-09
## iter: 1 mgc: 5.606397e-09
## Matching hessian patterns... Done
## outer mgc: 67.76317
## 0: 3014.5731: 2.00000 4.00000 2.00000 4.00000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 mgc: 5.606347e-09
## iter: 1 mgc: 5.606347e-09
## outer mgc: 67.76317
## 1: 3014.5731: 2.00000 4.00000 2.00000 4.00000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 mgc: 5.679886e-09
## iter: 1 mgc: 5.679886e-09
## outer mgc: 67.76317
## 2: 3014.5731: 2.00000 4.00000 2.00000 4.00000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 mgc: 9.516441e-09
## iter: 1 mgc: 9.516441e-09
## outer mgc: 67.76317
## 3: 3014.5731: 2.00000 4.00000 2.00000 4.00000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 value: 2049.07 mgc: 2.052274e-08 ustep: 1
## iter: 2 mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 67.76317
## 4: 3014.5731: 2.00000 4.00000 2.00000 4.00000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 value: 2049.07 mgc: 2.201269e-08 ustep: 1
## mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 67.76317
## 5: 3014.5731: 2.00000 4.00000 2.00000 4.00000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 value: 2049.07 mgc: 4.402524e-08 ustep: 1
## mgc: 6.425355e-11
## iter: 1 value: 2049.07 mgc: 1.320763e-07 ustep: 1
## mgc: 3.398359e-11
## iter: 1 value: 2049.07 mgc: 5.283042e-07 ustep: 1
## iter: 2 mgc: 2.910383e-11
## iter: 1 value: 2049.069 mgc: 2.113217e-06 ustep: 1
## iter: 2 mgc: 4.863965e-11
## iter: 1 value: 2049.069 mgc: 8.45287e-06 ustep: 1
## iter: 2 mgc: 5.820766e-11
## iter: 1 value: 2049.069 mgc: 3.38115e-05 ustep: 1
## iter: 2 mgc: 2.910383e-11
## iter: 1 value: 2049.068 mgc: 0.0001352463 ustep: 1
## iter: 2 mgc: 4.52296e-11
## iter: 1 value: 2049.062 mgc: 0.0005409897 ustep: 1
## iter: 2 mgc: 7.294787e-10
## iter: 1 value: 2049.038 mgc: 0.002164033 ustep: 1
## iter: 2 value: 2049.038 mgc: 1.166977e-08 ustep: 1

```

```

## mgc: 6.077305e-12
## iter: 1 value: 2048.945 mgc: 0.0086573 ustep: 1
## iter: 2 value: 2048.945 mgc: 1.867445e-07 ustep: 1
## iter: 3 mgc: 1.854583e-11
## iter: 1 value: 2048.572 mgc: 0.03464795 ustep: 1
## iter: 2 value: 2048.572 mgc: 2.989403e-06 ustep: 1
## iter: 3 mgc: 8.731149e-11
## iter: 1 value: 2047.083 mgc: 0.138892 ustep: 1
## iter: 2 value: 2047.083 mgc: 4.792499e-05 ustep: 1
## iter: 3 mgc: 3.513847e-10
## iter: 1 value: 2041.182 mgc: 0.5603852 ustep: 1
## iter: 2 value: 2041.182 mgc: 0.0007725589 ustep: 1
## iter: 3 value: 2041.182 mgc: 9.693463e-08 ustep: 1
## mgc: 1.164153e-10
## iter: 1 value: 2018.455 mgc: 2.31942 ustep: 1
## iter: 2 value: 2018.455 mgc: 0.01263663 ustep: 1
## iter: 3 value: 2018.455 mgc: 3.350845e-05 ustep: 1
## iter: 4 mgc: 8.731149e-11
## iter: 1 value: 1940.729 mgc: 10.55373 ustep: 1
## iter: 2 value: 1940.728 mgc: 0.159435 ustep: 1
## iter: 3 value: 1940.728 mgc: 0.03027955 ustep: 1
## iter: 4 value: 1940.728 mgc: 1.946607e-06 ustep: 1
## iter: 5 mgc: 3.037737e-11
## iter: 1 value: 1820.498 mgc: 18.69228 ustep: 1
## iter: 2 value: 1820.468 mgc: 1.75912 ustep: 1
## iter: 3 value: 1820.467 mgc: 0.7009446 ustep: 1
## iter: 4 value: 1820.467 mgc: 0.004075539 ustep: 1
## iter: 5 value: 1820.467 mgc: 6.971526e-06 ustep: 1
## iter: 6 mgc: 1.029339e-10
## iter: 1 mgc: 1.029339e-10
## outer mgc: 32.17814
## 6: 2890.0087: 2.83394 3.91907 2.87335 3.92257 3.03844 2.22887 2.22220 3.10353 2.05454 3
## iter: 1 value: 1553.129 mgc: 18.97872 ustep: 1
## iter: 2 value: 1553.1 mgc: 1.263111 ustep: 1
## iter: 3 value: 1553.1 mgc: 0.02100758 ustep: 1
## iter: 4 value: 1553.1 mgc: 3.481788e-05 ustep: 1
## iter: 5 mgc: 2.04911e-10
## iter: 1 value: 1275.226 mgc: 157.7755 ustep: 0.4367355
## iter: 2 value: 1199.803 mgc: 408.7943 ustep: 0.03321209
## iter: 3 value: 1195.55 mgc: 12.26211 ustep: 0.04906703
## iter: 4 value: 1192.152 mgc: 62.6147 ustep: 0.2215886
## iter: 5 value: 1191.619 mgc: 9.453863 ustep: 0.470785
## iter: 6 value: 1190.763 mgc: 28.95337 ustep: 0.4397499
## iter: 7 value: 1190.711 mgc: 1.108212 ustep: 0.6631701
## iter: 8 value: 1190.706 mgc: 1.668766 ustep: 0.8143711
## iter: 9 value: 1190.705 mgc: 0.06829378 ustep: 0.9024349
## iter: 10 value: 1190.705 mgc: 0.01438166 ustep: 0.9499707
## iter: 11 value: 1190.705 mgc: 0.0005757402 ustep: 0.974667
## iter: 12 value: 1190.705 mgc: 9.694615e-06 ustep: 0.9872535
## iter: 13 value: 1190.705 mgc: 2.270053e-07 ustep: 0.9936069
## iter: 14 mgc: 3.863629e-09
## iter: 1 mgc: 3.863629e-09
## outer mgc: 61.66904
## 7: 2811.8657: 6.30406 3.51508 6.66439 3.57869 3.29281 3.46436 3.45406 3.73753 2.37450 3
## iter: 1 value: 482.9409 mgc: 697.8871 ustep: 1
## iter: 2 value: 467.8634 mgc: 96.35149 ustep: 0.2494656

```

```

## iter: 3 value: 467.3341 mgc: 4.925067 ustep: 0.4995153
## iter: 4 value: 467.2718 mgc: 5.973545 ustep: 0.7067933
## iter: 5 value: 467.2669 mgc: 0.2112333 ustep: 0.8407259
## iter: 6 value: 467.2665 mgc: 0.06074512 ustep: 0.9169194
## iter: 7 value: 467.2665 mgc: 0.01476776 ustep: 0.9575633
## iter: 8 value: 467.2665 mgc: 0.001141126 ustep: 0.9785538
## iter: 9 value: 467.2665 mgc: 2.398092e-05 ustep: 0.9892199
## iter: 10 value: 467.2665 mgc: 2.259658e-07 ustep: 0.9945959
## iter: 11 mgc: 4.061816e-09
## iter: 1 mgc: 4.061816e-09
## outer mgc: 22.57711
## 8: 2775.6970: 5.92936 0.303336 4.53131 1.53466 3.94710 5.20856 5.39504 4.76744 3.06384 4
## iter: 1 value: 774.4243 mgc: 123.2988 ustep: 0.0692153
## iter: 2 value: 762.7289 mgc: 170.3063 ustep: 0.07349008
## iter: 3 value: 761.3999 mgc: 15.20969 ustep: 0.2711634
## iter: 4 value: 761.2051 mgc: 15.10442 ustep: 0.5207815
## iter: 5 value: 761.1986 mgc: 0.7238193 ustep: 0.7216797
## iter: 6 value: 761.1985 mgc: 0.08321661 ustep: 0.8495324
## iter: 7 value: 761.1985 mgc: 0.001771744 ustep: 0.9217087
## iter: 8 value: 761.1985 mgc: 0.0002807539 ustep: 0.9600606
## iter: 9 value: 761.1985 mgc: 1.850246e-05 ustep: 0.9798288
## iter: 10 value: 761.1985 mgc: 8.19365e-07 ustep: 0.989864
## iter: 11 value: 761.1985 mgc: 2.5771e-08 ustep: 0.9949196
## iter: 12 mgc: 4.440341e-10
## iter: 1 value: 572.8113 mgc: 26.93732 ustep: 1
## iter: 2 value: 572.7376 mgc: 2.794452 ustep: 1
## iter: 3 value: 572.7372 mgc: 0.2123849 ustep: 1
## iter: 4 value: 572.7372 mgc: 0.01401134 ustep: 1
## iter: 5 value: 572.7372 mgc: 7.400721e-06 ustep: 1
## iter: 6 mgc: 1.004328e-10
## iter: 1 mgc: 1.004328e-10
## outer mgc: 13.86278
## 9: 2743.4436: 4.94936 0.638340 5.51144 1.77884 4.07273 4.71297 4.86533 4.54569 3.10976 4
## iter: 1 value: 661.7847 mgc: 25.62762 ustep: 1
## iter: 2 value: 660.0135 mgc: 43.60471 ustep: 1
## iter: 3 value: 659.8642 mgc: 3.27778 ustep: 1
## iter: 4 value: 659.8542 mgc: 2.553219 ustep: 1
## iter: 5 value: 659.8541 mgc: 0.06389509 ustep: 1
## iter: 6 value: 659.8541 mgc: 0.0009824305 ustep: 1
## iter: 7 value: 659.8541 mgc: 1.86525e-08 ustep: 1
## mgc: 1.913714e-11
## iter: 1 mgc: 1.913714e-11
## outer mgc: 25.68101
## 10: 2734.2742: 6.10825 1.23144 5.75366 2.14532 4.30979 4.42489 4.13360 4.45537 3.22467 4
## iter: 1 value: 756.5968 mgc: 6.206937 ustep: 1
## iter: 2 value: 756.5824 mgc: 5.1138 ustep: 1
## iter: 3 value: 756.5823 mgc: 0.09388708 ustep: 1
## iter: 4 value: 756.5823 mgc: 0.003658793 ustep: 1
## iter: 5 value: 756.5823 mgc: 7.697129e-08 ustep: 1
## iter: 6 mgc: 6.866197e-11
## iter: 1 mgc: 6.866197e-11
## outer mgc: 8.140574
## 11: 2722.9872: 5.36230 2.12584 5.36370 2.60224 4.70052 4.09664 3.59072 4.23658 3.46179 4
## iter: 1 value: 517.3425 mgc: 22.12855 ustep: 1
## iter: 2 value: 517.0823 mgc: 14.29841 ustep: 1
## iter: 3 value: 517.0653 mgc: 1.716294 ustep: 1

```

```

## iter: 4 value: 517.065 mgc: 0.6105026 ustep: 1
## iter: 5 value: 517.065 mgc: 0.001305225 ustep: 1
## iter: 6 value: 517.065 mgc: 1.16211e-06 ustep: 1
## mgc: 1.321947e-10
## iter: 1 value: 647.5975 mgc: 5.201455 ustep: 1
## iter: 2 value: 647.5928 mgc: 1.235333 ustep: 1
## iter: 3 value: 647.5928 mgc: 0.05391782 ustep: 1
## iter: 4 value: 647.5928 mgc: 0.000103842 ustep: 1
## iter: 5 mgc: 5.286207e-10
## iter: 1 mgc: 5.286207e-10
## outer mgc: 5.515534
## 12: 2719.4120: 5.46866 2.12708 5.66969 2.54293 4.97034 4.14360 3.78913 4.23414 3.71729 4
## iter: 1 value: 601.2564 mgc: 9.389346 ustep: 1
## iter: 2 value: 601.2523 mgc: 1.154077 ustep: 1
## iter: 3 value: 601.2523 mgc: 0.02187513 ustep: 1
## iter: 4 value: 601.2523 mgc: 1.36607e-05 ustep: 1
## iter: 5 mgc: 1.153255e-10
## iter: 1 value: 630.1172 mgc: 3.550757 ustep: 1
## iter: 2 value: 630.1171 mgc: 0.1264048 ustep: 1
## iter: 3 value: 630.1171 mgc: 0.0009010507 ustep: 1
## iter: 4 mgc: 7.737246e-09
## iter: 1 mgc: 7.737246e-09
## outer mgc: 1.56647
## 13: 2718.2896: 5.56134 2.08932 5.63691 2.51912 5.01104 4.15850 3.80145 4.23967 3.77086 4
## iter: 1 value: 599.3929 mgc: 2.043481 ustep: 1
## iter: 2 value: 599.3929 mgc: 0.113147 ustep: 1
## iter: 3 value: 599.3929 mgc: 0.0002063861 ustep: 1
## iter: 4 mgc: 8.401875e-09
## iter: 1 mgc: 8.401875e-09
## outer mgc: 1.979851
## 14: 2717.7217: 5.55831 2.01460 5.65505 2.48032 5.10464 4.17270 3.81315 4.23713 3.89946 4
## iter: 1 value: 535.7752 mgc: 5.014426 ustep: 1
## iter: 2 value: 535.7743 mgc: 0.5963503 ustep: 1
## iter: 3 value: 535.7743 mgc: 0.002236094 ustep: 1
## iter: 4 value: 535.7743 mgc: 2.196077e-06 ustep: 1
## iter: 5 mgc: 9.860734e-11
## iter: 1 mgc: 9.860734e-11
## outer mgc: 1.680907
## 15: 2716.6237: 5.58132 1.98699 5.69388 2.46271 5.28745 4.20103 3.79527 4.22952 4.21416 4
## iter: 1 value: 514.7354 mgc: 3.440227 ustep: 1
## iter: 2 value: 514.7349 mgc: 0.412901 ustep: 1
## iter: 3 value: 514.7349 mgc: 0.00105665 ustep: 1
## iter: 4 value: 514.7349 mgc: 3.277645e-07 ustep: 1
## mgc: 1.463138e-10
## iter: 1 mgc: 1.463138e-10
## outer mgc: 5.146769
## 16: 2716.4257: 5.58951 1.97669 5.49066 2.46755 5.35840 4.14337 3.68078 4.18675 4.51323 4
## iter: 1 value: 473.1023 mgc: 4.116689 ustep: 1
## iter: 2 value: 473.1022 mgc: 0.3038748 ustep: 1
## iter: 3 value: 473.1022 mgc: 0.0003757405 ustep: 1
## iter: 4 value: 473.1022 mgc: 3.512966e-08 ustep: 1
## mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10
## outer mgc: 1.15571
## 17: 2715.3591: 5.62103 2.01345 5.61294 2.50516 5.33027 4.09684 3.61848 4.15263 4.85408 4
## iter: 1 value: 424.8067 mgc: 7.347686 ustep: 1

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## iter: 2 value: 424.8066 mgc: 0.1746931 ustep: 1
## iter: 3 value: 424.8066 mgc: 0.0003010424 ustep: 1
## iter: 4 value: 424.8066 mgc: 3.027461e-08 ustep: 1
## mgc: 8.794721e-11
## iter: 1 mgc: 8.794721e-11
## outer mgc: 0.6813002
## 18: 2714.9176: 5.56672 1.93815 5.64331 2.43836 5.34215 4.08834 3.55036 4.17244 5.17056 4
## iter: 1 value: 365.6826 mgc: 5.648581 ustep: 1
## iter: 2 value: 365.6822 mgc: 0.8218765 ustep: 1
## iter: 3 value: 365.6822 mgc: 0.001990435 ustep: 1
## iter: 4 value: 365.6822 mgc: 3.038027e-06 ustep: 1
## iter: 5 mgc: 6.123613e-11
## iter: 1 mgc: 6.123613e-11
## outer mgc: 0.7169432
## 19: 2714.6277: 5.57247 2.01854 5.63823 2.49287 5.36584 4.03446 3.58719 4.17017 5.48716 4
## iter: 1 value: 329.8219 mgc: 6.336281 ustep: 1
## iter: 2 value: 329.8218 mgc: 0.3249884 ustep: 1
## iter: 3 value: 329.8218 mgc: 0.0004486018 ustep: 1
## iter: 4 value: 329.8218 mgc: 1.071802e-07 ustep: 1
## mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 0.9597034
## 20: 2714.4242: 5.58427 1.98323 5.67119 2.51507 5.34615 3.99894 3.51169 4.17847 5.82449 4
## iter: 1 value: 286.983 mgc: 9.57067 ustep: 1
## iter: 2 value: 286.983 mgc: 0.1987662 ustep: 1
## iter: 3 value: 286.983 mgc: 4.449368e-05 ustep: 1
## iter: 4 mgc: 3.213736e-09
## iter: 1 mgc: 3.213736e-09
## outer mgc: 0.8945843
## 21: 2714.3069: 5.59179 2.02718 5.65800 2.43516 5.32019 4.00437 3.45088 4.23573 6.17562 4
## iter: 1 value: 236.1144 mgc: 10.58107 ustep: 1
## iter: 2 value: 236.1143 mgc: 0.3545514 ustep: 1
## iter: 3 value: 236.1143 mgc: 5.125955e-05 ustep: 1
## iter: 4 mgc: 1.472237e-09
## iter: 1 mgc: 1.472237e-09
## outer mgc: 0.5969341
## 22: 2714.1660: 5.56920 1.98634 5.64134 2.50045 5.30258 3.98411 3.44765 4.31375 6.52958 4
## iter: 1 value: 187.6767 mgc: 9.051501 ustep: 1
## iter: 2 value: 187.6766 mgc: 0.3798641 ustep: 1
## iter: 3 value: 187.6766 mgc: 0.0001433537 ustep: 1
## iter: 4 value: 187.6766 mgc: 1.977781e-08 ustep: 1
## mgc: 6.952527e-11
## iter: 1 mgc: 6.952527e-11
## outer mgc: 0.60299
## 23: 2714.0619: 5.53773 2.00808 5.64818 2.46004 5.30160 3.91278 3.48131 4.38638 6.87807 4
## iter: 1 value: 148.1319 mgc: 8.590861 ustep: 1
## iter: 2 value: 148.1319 mgc: 0.09897787 ustep: 1
## iter: 3 value: 148.1319 mgc: 3.315848e-05 ustep: 1
## iter: 4 mgc: 6.952671e-10
## iter: 1 mgc: 6.952671e-10
## outer mgc: 0.3720682
## 24: 2713.9758: 5.54117 1.98246 5.64330 2.47686 5.33088 3.85292 3.49792 4.46491 7.22026 4
## iter: 1 value: 103.4951 mgc: 12.08559 ustep: 1
## iter: 2 value: 103.495 mgc: 0.1157925 ustep: 1
## iter: 3 value: 103.495 mgc: 5.148363e-05 ustep: 1
## iter: 4 mgc: 1.13895e-09

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## iter: 1 mgc: 1.13895e-09
## outer mgc: 0.3463902
## 25:      2713.9445: 5.53767 1.98503 5.63452 2.48733 5.32779 3.88323 3.52481 4.57250 7.54762 4
## iter: 1 value: 74.57764 mgc: 6.41548 ustep: 1
## iter: 2 value: 74.57749 mgc: 0.2273046 ustep: 1
## iter: 3 value: 74.57749 mgc: 0.0002901448 ustep: 1
## iter: 4 value: 74.57749 mgc: 6.086571e-08 ustep: 1
## mgc: 8.24274e-11
## iter: 1 mgc: 8.24274e-11
## outer mgc: 0.1906721
## 26:      2713.9192: 5.54085 1.99051 5.64589 2.49375 5.29222 3.82973 3.63155 4.62191 7.82694 4
## iter: 1 value: 98.90204 mgc: 4.460381 ustep: 1
## iter: 2 value: 98.90203 mgc: 0.05488764 ustep: 1
## iter: 3 value: 98.90203 mgc: 4.901674e-06 ustep: 1
## iter: 4 mgc: 6.114664e-11
## iter: 1 mgc: 6.114664e-11
## outer mgc: 0.4269864
## 27:      2713.9135: 5.55917 1.97461 5.64497 2.47356 5.36479 3.78861 3.63947 4.56658 7.70307 4
## iter: 1 value: 107.2413 mgc: 1.454633 ustep: 1
## iter: 2 value: 107.2413 mgc: 0.03251568 ustep: 1
## iter: 3 value: 107.2413 mgc: 4.649887e-06 ustep: 1
## iter: 4 mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10
## outer mgc: 0.2020367
## 28:      2713.9072: 5.54329 2.00867 5.65096 2.49262 5.36771 3.87410 3.61155 4.56831 7.56509 4
## iter: 1 value: 110.4257 mgc: 1.14801 ustep: 1
## iter: 2 value: 110.4257 mgc: 0.05973429 ustep: 1
## iter: 3 value: 110.4257 mgc: 1.654319e-05 ustep: 1
## iter: 4 mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10
## outer mgc: 0.208609
## 29:      2713.9009: 5.54254 1.98332 5.64458 2.47968 5.27749 3.86847 3.63086 4.56197 7.53920 4
## iter: 1 value: 105.077 mgc: 0.6854848 ustep: 1
## iter: 2 value: 105.077 mgc: 0.04914521 ustep: 1
## iter: 3 value: 105.077 mgc: 3.78191e-06 ustep: 1
## iter: 4 mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10
## outer mgc: 0.0297778
## 30:      2713.8893: 5.54673 1.98640 5.64643 2.48262 5.31593 3.84447 3.65071 4.56990 7.59227 4
## iter: 1 value: 109.3921 mgc: 1.066496 ustep: 1
## iter: 2 value: 109.3921 mgc: 0.07931345 ustep: 1
## iter: 3 value: 109.3921 mgc: 7.699871e-06 ustep: 1
## iter: 4 mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 0.04476828
## 31:      2713.8838: 5.54783 1.99018 5.64774 2.48498 5.33413 3.84732 3.65781 4.56212 7.54524 4
## iter: 1 value: 115.7752 mgc: 1.80406 ustep: 1
## iter: 2 value: 115.775 mgc: 0.5772488 ustep: 1
## iter: 3 value: 115.775 mgc: 0.0002227231 ustep: 1
## iter: 4 value: 115.775 mgc: 5.83251e-08 ustep: 1
## mgc: 6.109802e-11
## iter: 1 mgc: 6.109802e-11
## outer mgc: 0.07348827
## 32:      2713.8757: 5.54903 1.99272 5.64819 2.48843 5.34133 3.85271 3.67627 4.55078 7.46102 4
## iter: 1 value: 124.5728 mgc: 2.808557 ustep: 1
## iter: 2 value: 124.57 mgc: 2.612302 ustep: 1

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## iter: 3 value: 124.57 mgc: 0.002978594 ustep: 1
## iter: 4 value: 124.57 mgc: 8.639386e-06 ustep: 1
## iter: 5 mgc: 6.778648e-11
## iter: 1 mgc: 6.778648e-11
## outer mgc: 0.0646959
## 33: 2713.8651: 5.54937 1.99293 5.64835 2.49236 5.34585 3.86093 3.70819 4.53523 7.32229 5
## iter: 1 value: 129.72 mgc: 2.683795 ustep: 1
## iter: 2 value: 129.7147 mgc: 3.832488 ustep: 1
## iter: 3 value: 129.7147 mgc: 0.002979369 ustep: 1
## iter: 4 value: 129.7147 mgc: 2.138728e-06 ustep: 1
## iter: 5 mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10
## outer mgc: 0.04914496
## 34: 2713.8564: 5.55023 1.99131 5.64658 2.49547 5.32629 3.87032 3.72870 4.52151 7.21299 5
## iter: 1 value: 124.4942 mgc: 2.342305 ustep: 1
## iter: 2 value: 124.4889 mgc: 3.848173 ustep: 1
## iter: 3 value: 124.4889 mgc: 0.001786813 ustep: 1
## iter: 4 value: 124.4889 mgc: 1.207998e-07 ustep: 1
## iter: 5 mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 0.0331604
## 35: 2713.8520: 5.54904 1.98871 5.64547 2.49766 5.32498 3.87088 3.74875 4.52478 7.19741 5
## iter: 1 value: 118.1722 mgc: 1.798505 ustep: 1
## iter: 2 value: 118.1721 mgc: 0.4354253 ustep: 1
## iter: 3 value: 118.1721 mgc: 5.188911e-05 ustep: 1
## iter: 4 mgc: 2.112504e-09
## iter: 1 mgc: 2.112504e-09
## outer mgc: 0.03422755
## 36: 2713.8494: 5.54882 1.98814 5.64492 2.49609 5.31669 3.86546 3.73678 4.53378 7.27812 5
## iter: 1 value: 110.3539 mgc: 1.721136 ustep: 1
## iter: 2 value: 110.3539 mgc: 0.02416859 ustep: 1
## iter: 3 value: 110.3539 mgc: 1.658731e-06 ustep: 1
## iter: 4 mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 0.01768542
## 37: 2713.8470: 5.54835 1.98876 5.64555 2.49562 5.31769 3.86073 3.73645 4.54273 7.35427 5
## iter: 1 value: 101.8564 mgc: 1.937503 ustep: 1
## iter: 2 value: 101.8564 mgc: 0.02211714 ustep: 1
## iter: 3 value: 101.8564 mgc: 5.585709e-08 ustep: 1
## iter: 4 mgc: 3.383193e-11
## iter: 1 mgc: 3.383193e-11
## outer mgc: 0.01696224
## 38: 2713.8433: 5.54766 1.98895 5.64567 2.49575 5.32078 3.85711 3.73679 4.55052 7.43977 5
## iter: 1 value: 95.28729 mgc: 1.7019 ustep: 1
## iter: 2 value: 95.28728 mgc: 0.1348005 ustep: 1
## iter: 3 value: 95.28728 mgc: 4.147063e-06 ustep: 1
## iter: 4 mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10
## outer mgc: 0.02783154
## 39: 2713.8382: 5.54732 1.98917 5.64646 2.49630 5.32621 3.85337 3.74353 4.55490 7.51842 5
## iter: 1 value: 94.73174 mgc: 1.055428 ustep: 1
## iter: 2 value: 94.73174 mgc: 0.08022937 ustep: 1
## iter: 3 value: 94.73174 mgc: 7.787874e-06 ustep: 1
## iter: 4 mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 0.0326149

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## 40:      2713.8342:  5.54698  1.98934  5.64656  2.49782  5.33218  3.85204  3.75234  4.55741  7.54397  5
## iter: 1  value: 98.79844 mgc: 0.8385779 ustep: 1
## iter: 2  value: 98.79844 mgc: 0.03948127 ustep: 1
## iter: 3  value: 98.79844 mgc: 3.687655e-06 ustep: 1
## iter: 4  mgc: 6.333956e-11
## iter: 1  mgc: 6.333956e-11
## outer mgc: 0.02868928
## 41:      2713.8306:  5.54729  1.98901  5.64642  2.49909  5.32766  3.84981  3.76152  4.55868  7.52770  5
## iter: 1  value: 106.1365 mgc: 0.9148387 ustep: 1
## iter: 2  value: 106.1365 mgc: 0.07379566 ustep: 1
## iter: 3  value: 106.1365 mgc: 1.051653e-06 ustep: 1
## iter: 4  mgc: 5.484875e-11
## iter: 1  mgc: 5.484875e-11
## outer mgc: 0.02205343
## 42:      2713.8272:  5.54721  1.98872  5.64656  2.49945  5.33175  3.85146  3.76289  4.55900  7.48023  5
## iter: 1  value: 110.4376 mgc: 0.8748336 ustep: 1
## iter: 2  value: 110.4376 mgc: 0.0009406047 ustep: 1
## iter: 3  mgc: 7.960784e-09
## iter: 1  mgc: 7.960784e-09
## outer mgc: 0.01963478
## 43:      2713.8251:  5.54766  1.98854  5.64602  2.49927  5.32076  3.85109  3.76095  4.55600  7.44057  5
## iter: 1  value: 111.8924 mgc: 0.4662586 ustep: 1
## iter: 2  value: 111.8924 mgc: 0.08790977 ustep: 1
## iter: 3  value: 111.8924 mgc: 1.093721e-05 ustep: 1
## iter: 4  mgc: 1.250768e-10
## iter: 1  mgc: 1.250768e-10
## outer mgc: 0.02272512
## 44:      2713.8231:  5.54757  1.98874  5.64623  2.49804  5.32166  3.85407  3.75020  4.55023  7.42577  5
## iter: 1  value: 110.5409 mgc: 0.7784585 ustep: 1
## iter: 2  value: 110.5409 mgc: 0.1734774 ustep: 1
## iter: 3  value: 110.5409 mgc: 3.821377e-05 ustep: 1
## iter: 4  mgc: 1.492706e-09
## iter: 1  mgc: 1.492706e-09
## outer mgc: 0.01930748
## 45:      2713.8203:  5.54739  1.98880  5.64635  2.49652  5.32265  3.85657  3.73648  4.54500  7.43379  5
## iter: 1  value: 110.2032 mgc: 0.6603095 ustep: 1
## iter: 2  value: 110.2032 mgc: 0.1739726 ustep: 1
## iter: 3  value: 110.2032 mgc: 1.45772e-05 ustep: 1
## iter: 4  mgc: 2.104592e-10
## iter: 1  mgc: 2.104592e-10
## outer mgc: 0.0117356
## 46:      2713.8187:  5.54751  1.98898  5.64651  2.49535  5.32544  3.85808  3.72698  4.54241  7.43980  5
## iter: 1  value: 110.9204 mgc: 0.3594822 ustep: 1
## iter: 2  value: 110.9204 mgc: 0.03988234 ustep: 1
## iter: 3  value: 110.9204 mgc: 2.583805e-07 ustep: 1
## iter: 4  mgc: 5.107181e-11
## iter: 1  mgc: 5.107181e-11
## outer mgc: 0.007374737
## 47:      2713.8180:  5.54779  1.98883  5.64641  2.49509  5.32498  3.85797  3.72751  4.54292  7.43622  5
## iter: 1  value: 112.6578 mgc: 0.1999255 ustep: 1
## iter: 2  value: 112.6578 mgc: 0.009442871 ustep: 1
## iter: 3  value: 112.6578 mgc: 2.710323e-08 ustep: 1
## iter: 4  mgc: 1.164153e-10
## iter: 1  mgc: 1.164153e-10
## outer mgc: 0.004427373
## 48:      2713.8177:  5.54783  1.98881  5.64636  2.49511  5.32521  3.85758  3.72929  4.54378  7.42605  5

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## iter: 1 value: 113.1192 mgc: 0.07122128 ustep: 1
## iter: 2 value: 113.1192 mgc: 0.001548064 ustep: 1
## iter: 3 mgc: 6.854819e-09
## iter: 1 mgc: 6.854819e-09
## outer mgc: 0.004275707
## 49: 2713.8177: 5.54784 1.98867 5.64631 2.49526 5.32402 3.85721 3.73161 4.54436 7.42239 5
## iter: 1 value: 113.3626 mgc: 0.05287726 ustep: 1
## iter: 2 value: 113.3626 mgc: 0.002275666 ustep: 1
## iter: 3 mgc: 4.063555e-09
## iter: 1 mgc: 4.063555e-09
## outer mgc: 0.004028559
## 50: 2713.8176: 5.54780 1.98862 5.64628 2.49540 5.32358 3.85701 3.73301 4.54471 7.42042 5
## iter: 1 value: 113.7782 mgc: 0.1694956 ustep: 1
## iter: 2 value: 113.7782 mgc: 0.0259677 ustep: 1
## iter: 3 value: 113.7782 mgc: 3.137233e-07 ustep: 1
## iter: 4 mgc: 1.74623e-10
## iter: 1 mgc: 1.74623e-10
## outer mgc: 0.006043434
## 51: 2713.8175: 5.54769 1.98851 5.64620 2.49578 5.32279 3.85658 3.73655 4.54547 7.41677 5
## iter: 1 value: 113.7469 mgc: 0.1062499 ustep: 1
## iter: 2 value: 113.7469 mgc: 0.007853452 ustep: 1
## iter: 3 value: 113.7469 mgc: 1.376294e-08 ustep: 1
## mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 0.007039694
## 52: 2713.8174: 5.54765 1.98853 5.64616 2.49596 5.32293 3.85656 3.73778 4.54569 7.41693 5
## iter: 1 value: 113.3921 mgc: 0.1061558 ustep: 1
## iter: 2 value: 113.3921 mgc: 9.410776e-05 ustep: 1
## iter: 3 mgc: 6.308465e-11
## iter: 1 mgc: 6.308465e-11
## outer mgc: 0.004145705
## 53: 2713.8173: 5.54768 1.98862 5.64617 2.49592 5.32371 3.85685 3.73681 4.54553 7.41995 5
## iter: 1 value: 113.0486 mgc: 0.05472666 ustep: 1
## iter: 2 value: 113.0486 mgc: 0.001635483 ustep: 1
## iter: 3 mgc: 3.470459e-09
## iter: 1 mgc: 3.470459e-09
## outer mgc: 0.00117336
## 54: 2713.8173: 5.54774 1.98870 5.64618 2.49579 5.32429 3.85712 3.73524 4.54529 7.42262 5
## iter: 1 value: 112.9393 mgc: 0.01817952 ustep: 1
## iter: 2 value: 112.9393 mgc: 0.0003687552 ustep: 1
## iter: 3 mgc: 1.062386e-10
## iter: 1 mgc: 1.062386e-10
## outer mgc: 0.001146941
## 55: 2713.8172: 5.54776 1.98872 5.64619 2.49574 5.32444 3.85719 3.73467 4.54525 7.42332 5
## iter: 1 value: 112.8253 mgc: 0.02010325 ustep: 1
## iter: 2 value: 112.8253 mgc: 0.0004507457 ustep: 1
## iter: 3 mgc: 1.379608e-10
## iter: 1 mgc: 1.379608e-10
## outer mgc: 0.001746874
## 56: 2713.8172: 5.54779 1.98873 5.64619 2.49569 5.32457 3.85725 3.73407 4.54523 7.42394 5
## iter: 1 value: 112.7098 mgc: 0.02248289 ustep: 1
## iter: 2 value: 112.7098 mgc: 0.000557694 ustep: 1
## iter: 3 mgc: 2.328306e-10
## iter: 1 mgc: 2.328306e-10
## outer mgc: 0.003251875
## 57: 2713.8172: 5.54783 1.98874 5.64620 2.49562 5.32469 3.85729 3.73341 4.54526 7.42451 5

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## iter: 1 value: 112.6648 mgc: 0.02450381 ustep: 1
## iter: 2 value: 112.6648 mgc: 0.0002772594 ustep: 1
## iter: 3 mgc: 9.128942e-11
## iter: 1 mgc: 9.128942e-11
## outer mgc: 0.004258593
## 58: 2713.8172: 5.54785 1.98875 5.64619 2.49559 5.32472 3.85731 3.73298 4.54526 7.42478 5
## iter: 1 value: 112.7824 mgc: 0.01964209 ustep: 1
## iter: 2 value: 112.7824 mgc: 6.641399e-05 ustep: 1
## iter: 3 mgc: 1.28201e-10
## iter: 1 mgc: 1.28201e-10
## outer mgc: 0.003320224
## 59: 2713.8172: 5.54783 1.98874 5.64620 2.49561 5.32460 3.85724 3.73330 4.54523 7.42435 5
## iter: 1 value: 113.0069 mgc: 0.02608801 ustep: 1
## iter: 2 value: 113.0069 mgc: 0.0006854333 ustep: 1
## iter: 3 mgc: 3.900027e-10
## iter: 1 mgc: 3.900027e-10
## outer mgc: 0.001124751
## 60: 2713.8172: 5.54778 1.98872 5.64620 2.49568 5.32436 3.85717 3.73415 4.54510 7.42351 5
## iter: 1 value: 113.1118 mgc: 0.01293483 ustep: 1
## iter: 2 value: 113.1118 mgc: 0.0001738489 ustep: 1
## iter: 3 mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10
## outer mgc: 0.0009414928
## 61: 2713.8172: 5.54776 1.98871 5.64621 2.49571 5.32428 3.85713 3.73458 4.54503 7.42313 5
## iter: 1 value: 113.175 mgc: 0.007858937 ustep: 1
## iter: 2 value: 113.175 mgc: 4.57938e-05 ustep: 1
## iter: 3 mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10
## outer mgc: 0.0007616289
## 62: 2713.8172: 5.54774 1.98871 5.64621 2.49573 5.32423 3.85713 3.73483 4.54495 7.42292 5
## iter: 1 value: 113.2174 mgc: 0.01302888 ustep: 1
## iter: 2 value: 113.2174 mgc: 4.970691e-06 ustep: 1
## iter: 3 mgc: 1.476423e-10
## iter: 1 mgc: 1.476423e-10
## outer mgc: 0.001327012
## 63: 2713.8172: 5.54773 1.98871 5.64621 2.49573 5.32421 3.85713 3.73498 4.54488 7.42278 5
## iter: 1 value: 113.2019 mgc: 0.01731452 ustep: 1
## iter: 2 value: 113.2019 mgc: 4.441617e-05 ustep: 1
## iter: 3 mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 0.001333849
## 64: 2713.8172: 5.54773 1.98871 5.64621 2.49572 5.32423 3.85715 3.73488 4.54486 7.42276 5
## iter: 1 value: 113.1217 mgc: 0.01026167 ustep: 1
## iter: 2 value: 113.1217 mgc: 0.0001470342 ustep: 1
## iter: 3 mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 0.0007165067
## 65: 2713.8172: 5.54774 1.98871 5.64621 2.49569 5.32428 3.85716 3.73456 4.54495 7.42290 5
## iter: 1 value: 113.0588 mgc: 0.006496217 ustep: 1
## iter: 2 value: 113.0588 mgc: 4.621894e-05 ustep: 1
## iter: 3 mgc: 4.981637e-11
## iter: 1 mgc: 4.981637e-11
## outer mgc: 0.0001705785
## 66: 2713.8172: 5.54776 1.98872 5.64621 2.49568 5.32432 3.85716 3.73434 4.54504 7.42301 5
## iter: 1 value: 113.0402 mgc: 0.002169197 ustep: 1
## iter: 2 value: 113.0402 mgc: 1.292686e-06 ustep: 1

```

```

## mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 0.0001694619
## 67:      2713.8172: 5.54776 1.98872 5.64621 2.49568 5.32433 3.85716 3.73428 4.54508 7.42303 5
## iter: 1 mgc: 5.820766e-11

## converged: relative convergence (4)

## Order of parameters:
## [1] "log_tau2_logpop_f"      "log_tau2_logpop_m"      "log_tau2_fx"            "log_tau2_gx_f"
## [5] "log_tau2_gx_m"          "log_basepop_f"          "log_basepop_m"          "log_fx"
## [9] "gx_f"                   "gx_m"                   "logit_rho_gx_f"         "logit_rho_gx_m"
## [13] "logit_rho_g_t_f"        "logit_rho_g_t_m"        "log_lambda_tp"          "log_lambda_tp_m"
## [17] "tp_params"              "log_dispersion_f"       "log_dispersion_m"       "log_phi"
## [21] "log_phi_innov_m"         "log_psi_innov_f"        "log_psi_innov_m"        "log_lambda_innov_m"
## [25] "log_lambda_innov_m"     "log_delta_innov_f"      "log_delta_innov_m"      "log_epsilon_innov_m"
## [29] "log_epsilon_innov_m"    "log_A_innov_f"          "log_A_innov_m"          "log_B_innov_m"
## [33] "log_B_innov_m"          "log_phi_f"              "log_phi_m"              "log_psi_f"
## [37] "log_psi_m"              "log_lambda_f"           "log_lambda_m"           "log_delta_f"
## [41] "log_delta_m"            "log_epsilon_f"          "log_epsilon_m"          "log_A_f"
## [45] "log_A_m"                "log_B_f"                "log_B_m"                "log_marginal_prec_phi_f"
## [49] "log_marginal_prec_phi_m" "log_marginal_prec_psi_f" "log_marginal_prec_psi_m" "log_marginal_prec_lambda_f"
## [53] "log_marginal_prec_lambda_m" "log_marginal_prec_delta_f" "log_marginal_prec_delta_m" "log_marginal_prec_epsilon_f"
## [57] "log_marginal_prec_epsilon_m" "log_marginal_prec_A_f" "log_marginal_prec_A_m" "log_marginal_prec_B_f"
## [61] "log_marginal_prec_B_m" "logit_rho_phi_f" "logit_rho_phi_m" "logit_rho_lambda_f"
## [65] "logit_rho_psi_m" "logit_rho_lambda_m" "logit_rho_lambda_m" "logit_rho_epsilon_f"
## [69] "logit_rho_delta_m" "logit_rho_epsilon_m" "logit_rho_epsilon_m" "logit_rho_B_f"
## [73] "logit_rho_A_m" "logit_rho_B_f" "logit_rho_B_m"

## Not matching template order:
## [1] "log_tau2_logpop_f"      "log_tau2_logpop_m"      "log_tau2_fx"            "log_tau2_gx_f"
## [5] "log_tau2_gx_m"          "logit_rho_gx_f"         "logit_rho_g_t_f"        "logit_rho_gx_m"
## [9] "logit_rho_g_t_m"        "log_basepop_f"          "log_basepop_m"          "log_fx"
## [13] "gx_f"                   "gx_m"                   "log_lambda_tp"          "log_lambda_tp_m"
## [17] "log_dispersion_f"       "log_dispersion_m"       "tp_params"              "log_phi"
## [21] "log_psi_f"              "log_lambda_f"           "log_delta_f"            "log_epsilon"
## [25] "log_A_f"                "log_B_f"                "log_phi_m"              "log_psi"
## [29] "log_lambda_m"           "log_delta_m"            "log_epsilon_m"          "log_A_m"
## [33] "log_B_m"                "log_marginal_prec_phi_f" "log_marginal_prec_psi_f" "log_marginal_prec_lambda_m"
## [37] "log_marginal_prec_delta_f" "log_marginal_prec_epsilon_f" "log_marginal_prec_A_f" "log_marginal_prec_B_m"
## [41] "log_marginal_prec_phi_m" "log_marginal_prec_psi_m" "log_marginal_prec_lambda_m" "logit_rho"
## [45] "log_marginal_prec_epsilon_m" "log_marginal_prec_A_m" "log_marginal_prec_B_m" "logit_rho"
## [49] "logit_rho_psi_f"        "logit_rho_A_f"          "logit_rho_B_f"          "logit_rho"
## [53] "logit_rho_psi_m"        "logit_rho_A_m"          "logit_rho_B_m"

## Your parameter list has been re-ordered.
## (Disable this warning with checkParameterOrder=FALSE)

## user system elapsed
## 60.22 1.60 62.54

## [1] "relative convergence (4)"

Thiele Normal Hump (Pop 5-9 to 70-74, DHS 15-19 to 45-49)

## user system elapsed
## 91.88 1.86 94.34

## [1] "relative convergence (4)"

Thiele log-Normal Hump (Pop 5-9 to 70-74, DHS 15-19 to 45-49)

## user system elapsed

```

## 90.77 1.77 93.26

## [1] "relative convergence (4)"

*Thiele log-Normal Hump RW (Pop 5-9 to 70-74, DHS 15-19 to 45-49)*

## Order of parameters:

## [1] "log_tau2_logpop_f"	"log_tau2_logpop_m"	"log_tau2_fx"	"log_tau2_m"
## [5] "log_tau2_gx_m"	"log_basepop_f"	"log_basepop_m"	"log_fx"
## [9] "gx_f"	"gx_m"	"logit_rho_g_x_f"	"logit_rho_g_x_m"
## [13] "logit_rho_g_t_f"	"logit_rho_g_t_m"	"log_lambda_tp"	"log_lambda_tp_m"
## [17] "tp_params"	"log_dispersion_f"	"log_dispersion_m"	"log_phi_f"
## [21] "log_phi_innov_m"	"log_psi_innov_f"	"log_psi_innov_m"	"log_lambda_f"
## [25] "log_lambda_innov_m"	"log_delta_innov_f"	"log_delta_innov_m"	"log_epsilon_f"
## [29] "log_epsilon_innov_m"	"log_A_innov_f"	"log_A_innov_m"	"log_B_innov_m"
## [33] "log_B_innov_m"	"log_phi_f"	"log_phi_m"	"log_psi_f"
## [37] "log_psi_m"	"log_lambda_f"	"log_lambda_m"	"log_delta_f"
## [41] "log_delta_m"	"log_epsilon_f"	"log_epsilon_m"	"log_A_f"
## [45] "log_A_m"	"log_B_f"	"log_B_m"	"log_marginal_prec_phi_f"
## [49] "log_marginal_prec_phi_m"	"log_marginal_prec_psi_f"	"log_marginal_prec_psi_m"	"log_marginal_prec_lambda_f"
## [53] "log_marginal_prec_lambda_m"	"log_marginal_prec_delta_f"	"log_marginal_prec_delta_m"	"log_marginal_prec_epsilon_f"
## [57] "log_marginal_prec_epsilon_m"	"log_marginal_prec_A_f"	"log_marginal_prec_A_m"	"log_marginal_prec_B_f"
## [61] "log_marginal_prec_B_m"	"logit_rho_phi_f"	"logit_rho_phi_m"	"logit_rho_lambda_f"
## [65] "logit_rho_psi_m"	"logit_rho_lambda_f"	"logit_rho_lambda_m"	"logit_rho_epsilon_f"
## [69] "logit_rho_delta_m"	"logit_rho_epsilon_f"	"logit_rho_epsilon_m"	"logit_rho_B_f"
## [73] "logit_rho_A_m"	"logit_rho_B_f"	"logit_rho_B_m"	

## Not matching template order:

## [1] "log_tau2_logpop_f"	"log_tau2_logpop_m"	"log_tau2_fx"	"log_tau2_m"
## [5] "log_tau2_gx_m"	"logit_rho_g_x_f"	"logit_rho_g_t_f"	"logit_rho_g_x_m"
## [9] "logit_rho_g_t_m"	"log_basepop_f"	"log_basepop_m"	"log_fx"
## [13] "gx_f"	"gx_m"	"log_lambda_tp"	"log_lambda_tp_m"
## [17] "log_dispersion_f"	"log_dispersion_m"	"tp_params"	"log_phi_f"
## [21] "log_psi_f"	"log_lambda_f"	"log_delta_f"	"log_epsilon_f"
## [25] "log_A_f"	"log_B_f"	"log_phi_m"	"log_psi_f"
## [29] "log_lambda_m"	"log_delta_m"	"log_epsilon_m"	"log_A_m"
## [33] "log_B_m"	"log_marginal_prec_phi_f"	"log_marginal_prec_psi_f"	"log_marginal_prec_lambda_f"
## [37] "log_marginal_prec_delta_f"	"log_marginal_prec_epsilon_f"	"log_marginal_prec_A_f"	"log_marginal_prec_B_f"
## [41] "log_marginal_prec_phi_m"	"log_marginal_prec_psi_m"	"log_marginal_prec_lambda_m"	"log_marginal_prec_epsilon_m"
## [45] "log_marginal_prec_epsilon_m"	"log_marginal_prec_A_m"	"log_marginal_prec_B_m"	"logit_rho_phi_f"
## [49] "logit_rho_psi_f"	"logit_rho_A_f"	"logit_rho_B_f"	"logit_rho_lambda_f"
## [53] "logit_rho_psi_m"	"logit_rho_A_m"	"logit_rho_B_m"	"logit_rho_epsilon_f"

## Your parameter list has been re-ordered.

## (Disable this warning with checkParameterOrder=FALSE)

## Optimizing tape... Done

## iter: 1 value: 2894.18 mgc: 176.112 ustep: 0.008923143  
## iter: 2 value: 2700.374 mgc: 81.09908 ustep: 0.02452091  
## iter: 3 value: 2326.837 mgc: 957.5357 ustep: 0.005308277  
## iter: 4 value: 1962.338 mgc: 222.3034 ustep: 0.07295064  
## iter: 5 value: 1864.654 mgc: 43.26035 ustep: 0.2701667  
## iter: 6 value: 1826.412 mgc: 70.94418 ustep: 0.3070217  
## iter: 7 value: 1823.788 mgc: 48.05496 ustep: 0.02491291  
## iter: 8 value: 1815.009 mgc: 150.4616 ustep: 0.1579225  
## iter: 9 value: 1812.338 mgc: 54.45108 ustep: 0.03115301  
## iter: 10 value: 1811.095 mgc: 7.598958 ustep: 0.1765845  
## iter: 11 value: 1810.323 mgc: 9.627636 ustep: 0.4202776  
## iter: 12 value: 1809.945 mgc: 2.391733 ustep: 0.6483233  
## iter: 13 value: 1809.822 mgc: 2.540204 ustep: 0.8052048  
## iter: 14 value: 1809.799 mgc: 0.8267388 ustep: 0.8973423

```

## iter: 15 value: 1809.797 mgc: 0.2763838 ustep: 0.9472868
## iter: 16 value: 1809.797 mgc: 0.02734826 ustep: 0.9732893
## iter: 17 value: 1809.797 mgc: 0.0008003788 ustep: 0.9865556
## iter: 18 value: 1809.797 mgc: 5.45168e-06 ustep: 0.9932557
## iter: 19 value: 1809.797 mgc: 7.551711e-08 ustep: 0.9966225
## iter: 20 mgc: 8.468508e-10
## iter: 1 mgc: 8.468508e-10
## Matching hessian patterns... Done
## outer mgc: 62.71434
## 0: 2773.3288: 2.00000 4.00000 2.00000 4.00000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 mgc: 1.551705e-09
## iter: 1 mgc: 1.551705e-09
## outer mgc: 62.71434
## 1: 2773.3288: 2.00000 4.0000 2.00000 4.0000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 mgc: 4.643439e-09
## iter: 1 mgc: 4.643439e-09
## outer mgc: 62.71434
## 2: 2773.3288: 2.00000 4.0000 2.00000 4.0000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 value: 1809.797 mgc: 1.082692e-08 ustep: 1
## iter: 2 mgc: 6.774997e-11
## iter: 1 mgc: 6.774997e-11
## outer mgc: 62.71434
## 3: 2773.3288: 2.00000 4.0000 2.00000 4.0000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 value: 1809.797 mgc: 1.236703e-08 ustep: 1
## mgc: 5.411477e-11
## iter: 1 mgc: 5.411477e-11
## outer mgc: 62.71434
## 4: 2773.3288: 2.00000 4.0000 2.00000 4.0000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 value: 1809.797 mgc: 2.473376e-08 ustep: 1
## mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 62.71434
## 5: 2773.3288: 2.00000 4.0000 2.00000 4.0000 3.00000 2.00000 2.00000 3.00000 2.00000 3
## iter: 1 value: 1809.797 mgc: 4.94676e-08 ustep: 1
## mgc: 5.820766e-11
## iter: 1 value: 1809.797 mgc: 1.484028e-07 ustep: 1
## mgc: 2.305256e-11
## iter: 1 value: 1809.797 mgc: 5.936125e-07 ustep: 1
## iter: 2 mgc: 5.820766e-11
## iter: 1 value: 1809.797 mgc: 2.37445e-06 ustep: 1
## iter: 2 mgc: 2.910383e-11
## iter: 1 value: 1809.797 mgc: 9.497802e-06 ustep: 1
## iter: 2 mgc: 5.163858e-11
## iter: 1 value: 1809.797 mgc: 3.799123e-05 ustep: 1
## iter: 2 mgc: 5.820766e-11
## iter: 1 value: 1809.795 mgc: 0.0001519652 ustep: 1
## iter: 2 mgc: 3.146616e-11
## iter: 1 value: 1809.79 mgc: 0.0006078663 ustep: 1
## iter: 2 mgc: 4.540617e-10
## iter: 1 value: 1809.767 mgc: 0.00243155 ustep: 1
## iter: 2 mgc: 7.274043e-09
## iter: 1 value: 1809.675 mgc: 0.009727558 ustep: 1
## iter: 2 value: 1809.675 mgc: 1.164433e-07 ustep: 1
## iter: 3 mgc: 4.365575e-11
## iter: 1 value: 1809.307 mgc: 0.03893185 ustep: 1
## iter: 2 value: 1809.307 mgc: 1.867075e-06 ustep: 1

```

```

## iter: 3 mgc: 5.919082e-11
## iter: 1 value: 1807.84 mgc: 0.1560739 ustep: 1
## iter: 2 value: 1807.84 mgc: 3.012966e-05 ustep: 1
## iter: 3 mgc: 1.013998e-10
## iter: 1 value: 1802.024 mgc: 0.629853 ustep: 1
## iter: 2 value: 1802.024 mgc: 0.000498886 ustep: 1
## iter: 3 value: 1802.024 mgc: 2.714316e-08 ustep: 1
## iter: 4 mgc: 4.365575e-11
## iter: 1 value: 1779.559 mgc: 2.609068 ustep: 1
## iter: 2 value: 1779.559 mgc: 0.009167097 ustep: 1
## iter: 3 value: 1779.559 mgc: 8.419808e-06 ustep: 1
## iter: 4 mgc: 5.820766e-11
## iter: 1 value: 1701.83 mgc: 11.8927 ustep: 1
## iter: 2 value: 1701.829 mgc: 0.2489928 ustep: 1
## iter: 3 value: 1701.829 mgc: 0.01648498 ustep: 1
## iter: 4 value: 1701.829 mgc: 5.621402e-06 ustep: 1
## iter: 5 mgc: 2.910383e-11
## iter: 1 value: 1574.006 mgc: 23.40924 ustep: 1
## iter: 2 value: 1573.68 mgc: 10.51949 ustep: 1
## iter: 3 value: 1573.625 mgc: 2.214847 ustep: 1
## iter: 4 value: 1573.621 mgc: 2.207758 ustep: 1
## iter: 5 value: 1573.621 mgc: 0.01746919 ustep: 1
## iter: 6 value: 1573.621 mgc: 0.0006255164 ustep: 1
## iter: 7 mgc: 3.200427e-10
## iter: 1 mgc: 3.200427e-10
## outer mgc: 31.69266
## 6: 2647.4576: 2.88620 3.91391 2.92793 3.91749 3.04074 2.24206 2.23497 3.10937 2.05796 3
## iter: 1 value: 1292.852 mgc: 21.17553 ustep: 1
## iter: 2 value: 1292.806 mgc: 1.637738 ustep: 1
## iter: 3 value: 1292.806 mgc: 0.03586588 ustep: 1
## iter: 4 value: 1292.806 mgc: 0.0001379143 ustep: 1
## iter: 5 mgc: 1.081123e-09
## iter: 1 value: 977.2236 mgc: 134.9189 ustep: 1
## iter: 2 value: 958.0401 mgc: 113.4774 ustep: 0.0692153
## iter: 3 value: 956.6147 mgc: 11.84227 ustep: 0.2631617
## iter: 4 value: 955.2733 mgc: 32.83248 ustep: 0.3021457
## iter: 5 value: 955.1876 mgc: 1.519327 ustep: 0.5497229
## iter: 6 value: 955.1754 mgc: 2.402718 ustep: 0.7414588
## iter: 7 value: 955.1737 mgc: 0.1471271 ustep: 0.8610939
## iter: 8 value: 955.1735 mgc: 0.06142413 ustep: 0.9279587
## iter: 9 value: 955.1735 mgc: 0.005935546 ustep: 0.9633098
## iter: 10 value: 955.1735 mgc: 0.0002545215 ustep: 0.9814853
## iter: 11 value: 955.1735 mgc: 3.193202e-06 ustep: 0.9907003
## iter: 12 value: 955.1735 mgc: 6.864355e-08 ustep: 0.9953398
## iter: 13 mgc: 9.751586e-10
## iter: 1 mgc: 9.751586e-10
## outer mgc: 55.10364
## 7: 2567.0939: 6.21790 3.51338 6.58360 3.57977 3.29424 3.45013 3.44248 3.73515 2.37409 3
## iter: 1 value: 384.4326 mgc: 614.0838 ustep: 1
## iter: 2 value: 271.8713 mgc: 392.7764 ustep: 0.002237842
## iter: 3 value: 246.1428 mgc: 284.7622 ustep: 0.0474011
## iter: 4 value: 240.147 mgc: 42.22693 ustep: 0.2177962
## iter: 5 value: 238.7402 mgc: 26.02835 ustep: 0.4667397
## iter: 6 value: 238.2683 mgc: 11.23311 ustep: 0.6832152
## iter: 7 value: 238.2373 mgc: 3.743904 ustep: 0.8265857
## iter: 8 value: 238.2363 mgc: 0.186758 ustep: 0.9091766

```



```

## iter: 9 value: 238.2363 mgc: 0.01745794 ustep: 0.9535122
## iter: 10 value: 238.2363 mgc: 0.001530146 ustep: 0.9764818
## iter: 11 value: 238.2363 mgc: 3.701827e-05 ustep: 0.9881721
## iter: 12 value: 238.2363 mgc: 3.501222e-07 ustep: 0.9940691
## iter: 13 mgc: 6.293218e-09
## iter: 1 mgc: 6.293218e-09
## outer mgc: 24.42976
## 8: 2531.5803: 5.97386 0.354729 4.71904 1.55790 3.94592 5.14159 5.33188 4.74830 3.05557 4
## iter: 1 value: 522.8391 mgc: 110.0119 ustep: 0.0692153
## iter: 2 value: 514.897 mgc: 125.0709 ustep: 0.07349008
## iter: 3 value: 513.8708 mgc: 12.00879 ustep: 0.2711634
## iter: 4 value: 513.746 mgc: 10.31125 ustep: 0.5207815
## iter: 5 value: 513.7408 mgc: 0.5646004 ustep: 0.7216797
## iter: 6 value: 513.7406 mgc: 0.05196126 ustep: 0.8495324
## iter: 7 value: 513.7406 mgc: 0.003029612 ustep: 0.9217087
## iter: 8 value: 513.7406 mgc: 0.001072823 ustep: 0.9600606
## iter: 9 value: 513.7406 mgc: 7.61688e-05 ustep: 0.9798288
## iter: 10 value: 513.7406 mgc: 1.768176e-06 ustep: 0.989864
## iter: 11 value: 513.7406 mgc: 5.013345e-08 ustep: 0.9949196
## iter: 12 mgc: 8.737153e-10
## iter: 1 value: 333.3167 mgc: 20.64128 ustep: 1
## iter: 2 value: 333.2661 mgc: 2.300576 ustep: 1
## iter: 3 value: 333.2659 mgc: 0.07627816 ustep: 1
## iter: 4 value: 333.2659 mgc: 0.007639592 ustep: 1
## iter: 5 value: 333.2659 mgc: 9.913463e-07 ustep: 1
## iter: 6 mgc: 2.910383e-11
## iter: 1 mgc: 2.910383e-11
## outer mgc: 13.11881
## 9: 2503.7607: 4.97882 0.664815 5.55013 1.78265 4.06403 4.70320 4.87700 4.54345 3.09418 4
## iter: 1 value: 414.2899 mgc: 22.97307 ustep: 1
## iter: 2 value: 411.9402 mgc: 70.16122 ustep: 1
## iter: 3 value: 411.8639 mgc: 2.153635 ustep: 1
## iter: 4 value: 411.8598 mgc: 1.549575 ustep: 1
## iter: 5 value: 411.8598 mgc: 0.02057311 ustep: 1
## iter: 6 value: 411.8598 mgc: 0.0005589822 ustep: 1
## iter: 7 mgc: 3.277288e-09
## iter: 1 mgc: 3.277288e-09
## outer mgc: 22.6869
## 10: 2493.9179: 6.04815 1.23791 5.69459 2.13894 4.29686 4.43068 4.20449 4.45920 3.19948 4
## iter: 1 value: 500.1943 mgc: 5.424607 ustep: 1
## iter: 2 value: 500.1195 mgc: 13.18138 ustep: 1
## iter: 3 value: 500.1185 mgc: 0.2017945 ustep: 1
## iter: 4 value: 500.1185 mgc: 0.0793443 ustep: 1
## iter: 5 value: 500.1185 mgc: 4.562805e-06 ustep: 1
## iter: 6 mgc: 8.326095e-11
## iter: 1 mgc: 8.326095e-11
## outer mgc: 7.691545
## 11: 2483.7361: 5.33244 2.06264 5.38562 2.56301 4.66880 4.12335 3.70180 4.25910 3.40951 4
## iter: 1 value: 279.2684 mgc: 15.85355 ustep: 1
## iter: 2 value: 279.1011 mgc: 9.773254 ustep: 1
## iter: 3 value: 279.092 mgc: 1.076076 ustep: 1
## iter: 4 value: 279.0919 mgc: 0.3704544 ustep: 1
## iter: 5 value: 279.0919 mgc: 0.0004011559 ustep: 1
## iter: 6 value: 279.0919 mgc: 1.969928e-07 ustep: 1
## mgc: 1.164153e-10
## iter: 1 mgc: 1.164153e-10

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## outer mgc: 9.974031
## 12:      2481.3038: 5.27667 2.16496 5.68251 2.43455 5.41025 4.21154 4.02587 4.23970 4.04403 4
## iter: 1 value: 111.1555 mgc: 16.52351 ustep: 1
## iter: 2 value: 111.0251 mgc: 8.66314 ustep: 1
## iter: 3 value: 111.0231 mgc: 0.3794232 ustep: 1
## iter: 4 value: 111.0231 mgc: 0.04040182 ustep: 1
## iter: 5 value: 111.0231 mgc: 3.15014e-05 ustep: 1
## iter: 6 mgc: 2.479545e-10
## iter: 1 value: 274.9298 mgc: 11.23587 ustep: 1
## iter: 2 value: 274.9184 mgc: 3.927332 ustep: 1
## iter: 3 value: 274.9182 mgc: 0.257969 ustep: 1
## iter: 4 value: 274.9182 mgc: 0.01312473 ustep: 1
## iter: 5 value: 274.9182 mgc: 3.571636e-06 ustep: 1
## iter: 6 mgc: 8.777068e-11
## iter: 1 mgc: 8.777068e-11
## outer mgc: 5.499695
## 13:      2478.6410: 5.63039 2.11331 5.62304 2.44707 5.40594 4.22430 3.94104 4.25371 4.09169 4
## iter: 1 value: 264.1557 mgc: 5.384454 ustep: 1
## iter: 2 value: 264.155 mgc: 0.6690175 ustep: 1
## iter: 3 value: 264.155 mgc: 0.002380698 ustep: 1
## iter: 4 value: 264.155 mgc: 5.923416e-06 ustep: 1
## iter: 5 mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 1.799623
## 14:      2477.3041: 5.58638 1.82054 5.68785 2.45952 5.45830 4.22093 3.70968 4.23346 4.38737 4
## iter: 1 value: 222.778 mgc: 5.528039 ustep: 1
## iter: 2 value: 222.7776 mgc: 0.708509 ustep: 1
## iter: 3 value: 222.7776 mgc: 0.007006001 ustep: 1
## iter: 4 value: 222.7776 mgc: 1.137628e-05 ustep: 1
## iter: 5 mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 5.42748
## 15:      2477.1672: 5.55745 2.02561 5.55993 2.46068 5.47320 4.12949 3.71075 4.18367 4.69378 4
## iter: 1 value: 141.009 mgc: 6.931733 ustep: 1
## iter: 2 value: 141.0083 mgc: 0.9775097 ustep: 1
## iter: 3 value: 141.0083 mgc: 0.005399794 ustep: 1
## iter: 4 value: 141.0083 mgc: 1.566611e-05 ustep: 1
## iter: 5 mgc: 2.910383e-11
## iter: 1 mgc: 2.910383e-11
## outer mgc: 2.154528
## 16:      2476.6035: 5.52704 2.06010 5.69961 2.43724 5.59338 4.13270 3.76543 4.17878 5.04064 4
## iter: 1 value: 168.5006 mgc: 5.405472 ustep: 1
## iter: 2 value: 168.4993 mgc: 1.107366 ustep: 1
## iter: 3 value: 168.4993 mgc: 0.02113545 ustep: 1
## iter: 4 value: 168.4993 mgc: 5.934348e-05 ustep: 1
## iter: 5 mgc: 6.963141e-11
## iter: 1 mgc: 6.963141e-11
## outer mgc: 4.146163
## 17:      2476.3364: 5.65306 1.98238 5.63407 2.54861 5.26494 4.10456 3.56939 4.20122 5.18323 4
## iter: 1 value: 133.4612 mgc: 5.3927 ustep: 1
## iter: 2 value: 133.4601 mgc: 1.311075 ustep: 1
## iter: 3 value: 133.4601 mgc: 0.008480037 ustep: 1
## iter: 4 value: 133.4601 mgc: 4.09891e-05 ustep: 1
## iter: 5 mgc: 3.696821e-11
## iter: 1 mgc: 3.696821e-11
## outer mgc: 1.267537

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## 18:      2475.6426:  5.59219  1.98884  5.64954  2.42966  5.24316  3.99749  3.53229  4.20773  5.49258  4
## iter: 1  value: 63.78302 mgc: 8.314268 ustep: 1
## iter: 2  value: 63.77567 mgc: 3.652384 ustep: 1
## iter: 3  value: 63.77567 mgc: 0.01473035 ustep: 1
## iter: 4  value: 63.77567 mgc: 0.0003283679 ustep: 1
## iter: 5  mgc: 8.785839e-11
## iter: 1  mgc: 8.785839e-11
## outer mgc: 0.9190408
## 19:      2475.3307:  5.54690  1.95991  5.63922  2.60086  5.35643  3.99314  3.60183  4.24704  5.80221  4
## iter: 1  value: 9.552194 mgc: 8.72408 ustep: 1
## iter: 2  value: 9.546891 mgc: 2.929867 ustep: 1
## iter: 3  value: 9.54689 mgc: 0.006009929 ustep: 1
## iter: 4  value: 9.54689 mgc: 4.804484e-05 ustep: 1
## iter: 5  mgc: 5.091838e-11
## iter: 1  mgc: 5.091838e-11
## outer mgc: 1.041729
## 20:      2475.0533:  5.53082  1.97598  5.63349  2.51168  5.43341  4.00964  3.61521  4.30039  6.10806  4
## iter: 1  value: -32.18936 mgc: 6.185431 ustep: 1
## iter: 2  value: -32.20183 mgc: 4.507722 ustep: 1
## iter: 3  value: -32.20183 mgc: 0.01381562 ustep: 1
## iter: 4  value: -32.20183 mgc: 0.0002363441 ustep: 1
## iter: 5  mgc: 1.526566e-10
## iter: 1  value: -143.3983 mgc: 22.01493 ustep: 1
## iter: 2  value: -143.882 mgc: 25.5856 ustep: 1
## iter: 3  value: -143.8845 mgc: 0.3363747 ustep: 1
## iter: 4  value: -143.8845 mgc: 0.09213602 ustep: 1
## iter: 5  value: -143.8845 mgc: 6.185007e-05 ustep: 1
## iter: 6  mgc: 1.730472e-09
## iter: 1  mgc: 1.730472e-09
## outer mgc: 2.703788
## 21:      2474.5645:  5.51148  2.00134  5.69174  2.47499  5.27564  3.80858  3.75344  4.45566  7.18966  5
## iter: 1  value: -300.1359 mgc: 32.76514 ustep: 1
## iter: 2  value: -301.5193 mgc: 39.78092 ustep: 1
## iter: 3  value: -301.5221 mgc: 0.3891072 ustep: 1
## iter: 4  value: -301.5221 mgc: 0.0711941 ustep: 1
## iter: 5  value: -301.5221 mgc: 2.563376e-05 ustep: 1
## iter: 6  mgc: 3.566063e-10
## iter: 1  value: -217.5285 mgc: 11.58456 ustep: 1
## iter: 2  value: -217.6136 mgc: 10.36096 ustep: 1
## iter: 3  value: -217.6136 mgc: 0.01737789 ustep: 1
## iter: 4  value: -217.6136 mgc: 8.25242e-05 ustep: 1
## iter: 5  mgc: 8.99254e-11
## iter: 1  mgc: 8.99254e-11
## outer mgc: 1.902884
## 22:      2474.2387:  5.49017  1.99544  5.67338  2.43190  5.31795  3.75231  3.81421  4.55140  7.60459  5
## iter: 1  value: -253.3176 mgc: 7.845822 ustep: 1
## iter: 2  value: -253.3315 mgc: 4.105475 ustep: 1
## iter: 3  value: -253.3315 mgc: 0.02271474 ustep: 1
## iter: 4  value: -253.3315 mgc: 0.0002397571 ustep: 1
## iter: 5  mgc: 1.164153e-10
## iter: 1  mgc: 1.164153e-10
## outer mgc: 1.769692
## 23:      2474.1322:  5.51845  1.99397  5.59388  2.46576  5.50802  3.92224  3.74867  4.65996  7.68680  6
## iter: 1  value: -171.3205 mgc: 9.477632 ustep: 1
## iter: 2  value: -171.3269 mgc: 2.424014 ustep: 1
## iter: 3  value: -171.3269 mgc: 0.007847643 ustep: 1

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## iter: 4 value: -171.3269 mgc: 8.089012e-05 ustep: 1
## iter: 5 mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 1.890176
## 24: 2474.1203: 5.59560 2.02978 5.63648 2.52893 5.22870 3.87562 3.74814 4.55229 7.34975 5
## iter: 1 value: -204.3906 mgc: 4.369281 ustep: 1
## iter: 2 value: -204.3908 mgc: 0.237911 ustep: 1
## iter: 3 value: -204.3908 mgc: 0.0004238847 ustep: 1
## iter: 4 value: -204.3908 mgc: 1.07524e-07 ustep: 1
## mgc: 8.905765e-11
## iter: 1 mgc: 8.905765e-11
## outer mgc: 0.2563428
## 25: 2473.8838: 5.54756 1.97760 5.64107 2.51927 5.23269 3.83766 3.85604 4.58526 7.46230 5
## iter: 1 value: -221.8221 mgc: 5.129141 ustep: 1
## iter: 2 value: -221.8223 mgc: 0.2150149 ustep: 1
## iter: 3 value: -221.8223 mgc: 0.0006047993 ustep: 1
## iter: 4 value: -221.8223 mgc: 6.224933e-08 ustep: 1
## mgc: 8.172575e-11
## iter: 1 value: -210.022 mgc: 1.72683 ustep: 1
## iter: 2 value: -210.022 mgc: 0.03193642 ustep: 1
## iter: 3 value: -210.022 mgc: 1.337377e-05 ustep: 1
## iter: 4 mgc: 8.731149e-11
## iter: 1 mgc: 8.731149e-11
## outer mgc: 0.2428872
## 26: 2473.8586: 5.53362 2.00814 5.64442 2.52275 5.29162 3.86720 3.83159 4.61213 7.47424 5
## iter: 1 value: -207.7118 mgc: 1.354947 ustep: 1
## iter: 2 value: -207.7118 mgc: 0.02945518 ustep: 1
## iter: 3 value: -207.7118 mgc: 2.42971e-06 ustep: 1
## iter: 4 mgc: 4.028872e-11
## iter: 1 mgc: 4.028872e-11
## outer mgc: 0.1886796
## 27: 2473.8560: 5.54246 1.98213 5.63586 2.51354 5.35898 3.81758 3.83498 4.60268 7.47355 5
## iter: 1 value: -213.2126 mgc: 1.303486 ustep: 1
## iter: 2 value: -213.2126 mgc: 0.02261366 ustep: 1
## iter: 3 value: -213.2126 mgc: 1.399477e-06 ustep: 1
## iter: 4 mgc: 8.192091e-11
## iter: 1 mgc: 8.192091e-11
## outer mgc: 0.09567783
## 28: 2473.8476: 5.53795 1.98925 5.63888 2.51515 5.32111 3.85505 3.83922 4.62674 7.46976 5
## iter: 1 value: -208.5593 mgc: 0.7662566 ustep: 1
## iter: 2 value: -208.5593 mgc: 0.02105516 ustep: 1
## iter: 3 value: -208.5593 mgc: 6.132098e-08 ustep: 1
## iter: 4 mgc: 1.056915e-10
## iter: 1 mgc: 1.056915e-10
## outer mgc: 0.06761636
## 29: 2473.8448: 5.54022 1.99427 5.64264 2.51818 5.31690 3.85449 3.84271 4.62089 7.44019 5
## iter: 1 value: -205.5549 mgc: 0.5258702 ustep: 1
## iter: 2 value: -205.5549 mgc: 0.001756262 ustep: 1
## iter: 3 value: -205.5549 mgc: 1.135609e-08 ustep: 1
## mgc: 8.214935e-11
## iter: 1 mgc: 8.214935e-11
## outer mgc: 0.06463833
## 30: 2473.8426: 5.54025 1.99444 5.64265 2.51824 5.31548 3.85401 3.84378 4.61809 7.41738 5
## iter: 1 value: -197.3836 mgc: 1.618836 ustep: 1
## iter: 2 value: -197.3836 mgc: 0.002599828 ustep: 1
## iter: 3 value: -197.3836 mgc: 7.046795e-08 ustep: 1

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## mgc: 7.709389e-11
## iter: 1 mgc: 7.709389e-11
## outer mgc: 0.08433808
## 31: 2473.8360: 5.54175 1.99504 5.64259 2.51776 5.31713 3.85309 3.84644 4.60746 7.34777 5
## iter: 1 value: -189.0672 mgc: 1.580011 ustep: 1
## iter: 2 value: -189.0672 mgc: 0.008488741 ustep: 1
## iter: 3 value: -189.0672 mgc: 1.398998e-07 ustep: 1
## iter: 4 mgc: 3.105403e-11
## iter: 1 mgc: 3.105403e-11
## outer mgc: 0.06742897
## 32: 2473.8311: 5.54092 1.99302 5.64209 2.51662 5.31852 3.85607 3.84556 4.59554 7.27500 5
## iter: 1 value: -185.2506 mgc: 0.9577369 ustep: 1
## iter: 2 value: -185.2506 mgc: 0.01080393 ustep: 1
## iter: 3 value: -185.2506 mgc: 5.006902e-08 ustep: 1
## iter: 4 mgc: 3.016186e-11
## iter: 1 mgc: 3.016186e-11
## outer mgc: 0.09397929
## 33: 2473.8267: 5.54196 1.99332 5.64180 2.51633 5.31947 3.85777 3.84372 4.58634 7.23524 5
## iter: 1 value: -180.1932 mgc: 1.325839 ustep: 1
## iter: 2 value: -180.1932 mgc: 0.003463891 ustep: 1
## iter: 3 value: -180.1932 mgc: 4.555935e-08 ustep: 1
## iter: 4 mgc: 4.365575e-11
## iter: 1 mgc: 4.365575e-11
## outer mgc: 0.04798817
## 34: 2473.8206: 5.54133 1.99061 5.64045 2.51518 5.32111 3.86652 3.83815 4.57287 7.17165 5
## iter: 1 value: -185.0789 mgc: 0.7112902 ustep: 1
## iter: 2 value: -185.0789 mgc: 0.01558022 ustep: 1
## iter: 3 value: -185.0789 mgc: 3.156925e-07 ustep: 1
## iter: 4 mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 0.02132264
## 35: 2473.8184: 5.54234 1.99233 5.64130 2.51612 5.32119 3.86590 3.83566 4.57617 7.20447 5
## iter: 1 value: -192.313 mgc: 1.429909 ustep: 1
## iter: 2 value: -192.313 mgc: 0.001179271 ustep: 1
## iter: 3 mgc: 2.708759e-09
## iter: 1 mgc: 2.708759e-09
## outer mgc: 0.01976808
## 36: 2473.8164: 5.54157 1.99155 5.64068 2.51635 5.31987 3.86678 3.83313 4.58595 7.26122 5
## iter: 1 value: -200.6109 mgc: 1.866064 ustep: 1
## iter: 2 value: -200.6109 mgc: 0.001522034 ustep: 1
## iter: 3 value: -200.6109 mgc: 1.277057e-08 ustep: 1
## mgc: 4.071255e-11
## iter: 1 mgc: 4.071255e-11
## outer mgc: 0.0436878
## 37: 2473.8142: 5.54101 1.99208 5.64068 2.51691 5.31955 3.86189 3.83230 4.59831 7.34118 5
## iter: 1 value: -206.9401 mgc: 1.549049 ustep: 1
## iter: 2 value: -206.9401 mgc: 0.002040763 ustep: 1
## iter: 3 mgc: 3.640315e-09
## iter: 1 mgc: 3.640315e-09
## outer mgc: 0.03844815
## 38: 2473.8122: 5.54038 1.99207 5.64093 2.51717 5.31964 3.85724 3.83279 4.60797 7.40895 5
## iter: 1 value: -216.1148 mgc: 2.681435 ustep: 1
## iter: 2 value: -216.1148 mgc: 0.01040942 ustep: 1
## iter: 3 value: -216.1148 mgc: 2.369126e-07 ustep: 1
## iter: 4 mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11

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## outer mgc: 0.02024177
## 39:      2473.8086: 5.53925 1.99210 5.64088 2.51727 5.31961 3.84611 3.83542 4.62148 7.52920 5
## iter: 1 value: -216.5226 mgc: 0.4799563 ustep: 1
## iter: 2 value: -216.5226 mgc: 0.002705482 ustep: 1
## iter: 3 mgc: 9.077207e-09
## iter: 1 mgc: 9.077207e-09
## outer mgc: 0.02374202
## 40:      2473.8064: 5.53899 1.99215 5.64148 2.51730 5.32056 3.84319 3.83893 4.62144 7.55510 5
## iter: 1 value: -213.0135 mgc: 0.3382627 ustep: 1
## iter: 2 value: -213.0135 mgc: 0.0006328503 ustep: 1
## iter: 3 mgc: 4.611668e-09
## iter: 1 mgc: 4.611668e-09
## outer mgc: 0.02534108
## 41:      2473.8042: 5.53889 1.99177 5.64148 2.51701 5.32068 3.84284 3.84153 4.61628 7.54377 5
## iter: 1 value: -203.607 mgc: 1.368612 ustep: 1
## iter: 2 value: -203.607 mgc: 0.0006973043 ustep: 1
## iter: 3 value: -203.607 mgc: 1.591132e-08 ustep: 1
## mgc: 3.098943e-11
## iter: 1 mgc: 3.098943e-11
## outer mgc: 0.03361228
## 42:      2473.8009: 5.53918 1.99162 5.64165 2.51675 5.32104 3.84639 3.84646 4.60304 7.48435 5
## iter: 1 value: -195.8045 mgc: 1.313499 ustep: 1
## iter: 2 value: -195.8045 mgc: 0.0012509 ustep: 1
## iter: 3 mgc: 1.210121e-09
## iter: 1 mgc: 1.210121e-09
## outer mgc: 0.03839494
## 43:      2473.7981: 5.53952 1.99117 5.64165 2.51650 5.32098 3.85114 3.84767 4.59438 7.42209 5
## iter: 1 value: -185.3539 mgc: 1.933728 ustep: 1
## iter: 2 value: -185.3539 mgc: 0.00789959 ustep: 1
## iter: 3 value: -185.3539 mgc: 5.771949e-08 ustep: 1
## iter: 4 mgc: 4.428075e-11
## iter: 1 mgc: 4.428075e-11
## outer mgc: 0.02049907
## 44:      2473.7940: 5.54052 1.99142 5.64172 2.51664 5.32083 3.85934 3.84799 4.58591 7.32383 5
## iter: 1 value: -185.0554 mgc: 0.4024154 ustep: 1
## iter: 2 value: -185.0554 mgc: 0.0008476553 ustep: 1
## iter: 3 mgc: 1.631491e-09
## iter: 1 mgc: 1.631491e-09
## outer mgc: 0.01920156
## 45:      2473.7921: 5.54074 1.99142 5.64172 2.51679 5.32093 3.86117 3.84520 4.58942 7.31039 5
## iter: 1 value: -189.6311 mgc: 0.6777145 ustep: 1
## iter: 2 value: -189.6311 mgc: 0.0004601075 ustep: 1
## iter: 3 mgc: 2.191419e-09
## iter: 1 mgc: 2.191419e-09
## outer mgc: 0.02239821
## 46:      2473.7905: 5.54073 1.99200 5.64157 2.51716 5.32095 3.85977 3.84176 4.59705 7.33694 5
## iter: 1 value: -194.4445 mgc: 0.7782851 ustep: 1
## iter: 2 value: -194.4445 mgc: 0.001037905 ustep: 1
## iter: 3 mgc: 9.293854e-09
## iter: 1 mgc: 9.293854e-09
## outer mgc: 0.01517431
## 47:      2473.7893: 5.54039 1.99198 5.64131 2.51715 5.32110 3.85752 3.83790 4.60276 7.37062 5
## iter: 1 value: -196.4013 mgc: 0.3438238 ustep: 1
## iter: 2 value: -196.4013 mgc: 0.0005301437 ustep: 1
## iter: 3 mgc: 2.189527e-09
## iter: 1 mgc: 2.189527e-09

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## outer mgc: 0.01088388
## 48:      2473.7886: 5.54021 1.99219 5.64112 2.51706 5.32099 3.85564 3.83704 4.60253 7.38759 5
## iter: 1 value: -195.3338 mgc: 0.1462017 ustep: 1
## iter: 2 value: -195.3338 mgc: 0.0002159568 ustep: 1
## iter: 3 mgc: 1.39627e-10
## iter: 1 mgc: 1.39627e-10
## outer mgc: 0.004512224
## 49:      2473.7885: 5.54007 1.99181 5.64104 2.51676 5.32105 3.85583 3.83740 4.59974 7.38327 5
## iter: 1 value: -194.4051 mgc: 0.1250801 ustep: 1
## iter: 2 value: -194.4051 mgc: 8.672669e-06 ustep: 1
## iter: 3 mgc: 5.913936e-11
## iter: 1 mgc: 5.913936e-11
## outer mgc: 0.003000236
## 50:      2473.7884: 5.54009 1.99180 5.64105 2.51671 5.32095 3.85607 3.83841 4.59798 7.37864 5
## iter: 1 value: -193.5455 mgc: 0.09655008 ustep: 1
## iter: 2 value: -193.5455 mgc: 2.926469e-06 ustep: 1
## iter: 3 mgc: 1.123897e-10
## iter: 1 mgc: 1.123897e-10
## outer mgc: 0.002913872
## 51:      2473.7884: 5.54008 1.99165 5.64106 2.51662 5.32092 3.85647 3.83920 4.59678 7.37468 5
## iter: 1 value: -192.4172 mgc: 0.1373926 ustep: 1
## iter: 2 value: -192.4172 mgc: 7.978627e-06 ustep: 1
## iter: 3 mgc: 4.260947e-11
## iter: 1 mgc: 4.260947e-11
## outer mgc: 0.005552501
## 52:      2473.7883: 5.54007 1.99144 5.64112 2.51651 5.32082 3.85694 3.84058 4.59537 7.37073 5
## iter: 1 value: -191.541 mgc: 0.1409007 ustep: 1
## iter: 2 value: -191.541 mgc: 1.278776e-05 ustep: 1
## iter: 3 mgc: 4.992673e-11
## iter: 1 mgc: 4.992673e-11
## outer mgc: 0.008459828
## 53:      2473.7881: 5.54004 1.99121 5.64118 2.51640 5.32071 3.85734 3.84198 4.59455 7.36928 5
## iter: 1 value: -191.7211 mgc: 0.08464122 ustep: 1
## iter: 2 value: -191.7211 mgc: 2.143811e-05 ustep: 1
## iter: 3 mgc: 5.820766e-11
## iter: 1 mgc: 5.820766e-11
## outer mgc: 0.009905716
## 54:      2473.7880: 5.54002 1.99113 5.64124 2.51640 5.32065 3.85722 3.84244 4.59520 7.37288 5
## iter: 1 value: -193.12 mgc: 0.1637811 ustep: 1
## iter: 2 value: -193.12 mgc: 1.775503e-05 ustep: 1
## iter: 3 mgc: 1.029798e-10
## iter: 1 mgc: 1.029798e-10
## outer mgc: 0.007331785
## 55:      2473.7878: 5.54005 1.99133 5.64122 2.51653 5.32074 3.85663 3.84121 4.59711 7.37960 5
## iter: 1 value: -194.3267 mgc: 0.1704208 ustep: 1
## iter: 2 value: -194.3267 mgc: 1.461649e-05 ustep: 1
## iter: 3 mgc: 5.310786e-11
## iter: 1 mgc: 5.310786e-11
## outer mgc: 0.002478535
## 56:      2473.7878: 5.54009 1.99158 5.64117 2.51667 5.32087 3.85610 3.83959 4.59840 7.38314 5
## iter: 1 value: -194.6514 mgc: 0.07077959 ustep: 1
## iter: 2 value: -194.6514 mgc: 3.291769e-06 ustep: 1
## iter: 3 mgc: 4.477969e-11
## iter: 1 mgc: 4.477969e-11
## outer mgc: 0.001183604
## 57:      2473.7878: 5.54012 1.99169 5.64113 2.51671 5.32094 3.85602 3.83890 4.59854 7.38302 5

```

```

## iter: 1 value: -194.6902 mgc: 0.02273453 ustep: 1
## iter: 2 value: -194.6902 mgc: 6.330763e-07 ustep: 1
## iter: 3 mgc: 5.581398e-11
## iter: 1 mgc: 5.581398e-11
## outer mgc: 0.001046686
## 58: 2473.7878: 5.54014 1.99172 5.64112 2.51673 5.32096 3.85602 3.83867 4.59843 7.38237 5
## iter: 1 value: -194.6803 mgc: 0.03290573 ustep: 1
## iter: 2 value: -194.6803 mgc: 3.322633e-06 ustep: 1
## iter: 3 mgc: 7.275958e-11
## iter: 1 mgc: 7.275958e-11
## outer mgc: 0.001929402
## 59: 2473.7877: 5.54015 1.99176 5.64109 2.51674 5.32100 3.85611 3.83839 4.59814 7.38098 5
## iter: 1 value: -194.6375 mgc: 0.02758483 ustep: 1
## iter: 2 value: -194.6375 mgc: 6.643279e-06 ustep: 1
## iter: 3 mgc: 7.521872e-11
## iter: 1 mgc: 7.521872e-11
## outer mgc: 0.002374525
## 60: 2473.7877: 5.54016 1.99177 5.64108 2.51675 5.32103 3.85618 3.83828 4.59791 7.37979 5
## iter: 1 value: -194.6067 mgc: 0.01907607 ustep: 1
## iter: 2 value: -194.6067 mgc: 3.881583e-06 ustep: 1
## iter: 3 mgc: 3.526202e-11
## iter: 1 mgc: 3.526202e-11
## outer mgc: 0.001846464
## 61: 2473.7877: 5.54016 1.99174 5.64108 2.51674 5.32103 3.85623 3.83840 4.59794 7.37963 5
## iter: 1 value: -194.6035 mgc: 0.03172794 ustep: 1
## iter: 2 value: -194.6035 mgc: 2.795204e-06 ustep: 1
## iter: 3 mgc: 6.213896e-11
## iter: 1 mgc: 6.213896e-11
## outer mgc: 0.0005061279
## 62: 2473.7877: 5.54014 1.99170 5.64110 2.51672 5.32101 3.85618 3.83874 4.59825 7.38049 5
## iter: 1 value: -194.6172 mgc: 0.01566234 ustep: 1
## iter: 2 value: -194.6172 mgc: 3.35077e-07 ustep: 1
## iter: 3 mgc: 5.820056e-11
## iter: 1 mgc: 5.820056e-11
## outer mgc: 0.0005024223
## 63: 2473.7877: 5.54013 1.99168 5.64111 2.51672 5.32100 3.85615 3.83889 4.59844 7.38108 5
## iter: 1 value: -194.6402 mgc: 0.0210356 ustep: 1
## iter: 2 value: -194.6402 mgc: 3.009091e-07 ustep: 1
## mgc: 4.332669e-11
## iter: 1 mgc: 4.332669e-11
## outer mgc: 0.0007897115
## 64: 2473.7877: 5.54012 1.99166 5.64112 2.51671 5.32098 3.85607 3.83907 4.59871 7.38191 5
## iter: 1 value: -194.6575 mgc: 0.01939697 ustep: 1
## iter: 2 value: -194.6575 mgc: 4.232371e-07 ustep: 1
## mgc: 3.552669e-11
## iter: 1 mgc: 3.552669e-11
## outer mgc: 0.001297287
## 65: 2473.7877: 5.54011 1.99164 5.64114 2.51671 5.32096 3.85601 3.83925 4.59897 7.38266 5
## iter: 1 value: -194.6632 mgc: 0.01741027 ustep: 1
## iter: 2 value: -194.6632 mgc: 9.355242e-07 ustep: 1
## mgc: 8.650836e-11
## iter: 1 mgc: 8.650836e-11
## outer mgc: 0.001770859
## 66: 2473.7877: 5.54010 1.99163 5.64115 2.51670 5.32094 3.85592 3.83944 4.59921 7.38336 5
## iter: 1 value: -194.6433 mgc: 0.005929361 ustep: 1
## iter: 2 value: -194.6433 mgc: 4.327742e-07 ustep: 1

```



```

## mgc: 6.368128e-11
## iter: 1 mgc: 6.368128e-11
## outer mgc: 0.001538313
## 67: 2473.7877: 5.54010 1.99164 5.64115 2.51670 5.32094 3.85592 3.83942 4.59914 7.38319 5
## iter: 1 value: -194.5982 mgc: 0.02948068 ustep: 1
## iter: 2 value: -194.5982 mgc: 9.5159e-07 ustep: 1
## iter: 3 mgc: 4.498846e-11
## iter: 1 mgc: 4.498846e-11
## outer mgc: 0.0006403702
## 68: 2473.7877: 5.54012 1.99167 5.64114 2.51671 5.32096 3.85602 3.83916 4.59872 7.38209 5
## iter: 1 value: -194.5875 mgc: 0.0167056 ustep: 1
## iter: 2 value: -194.5875 mgc: 1.933164e-07 ustep: 1
## mgc: 3.185475e-11
## iter: 1 mgc: 3.185475e-11
## outer mgc: 0.000180077
## 69: 2473.7877: 5.54013 1.99168 5.64112 2.51671 5.32097 3.85609 3.83897 4.59847 7.38145 5
## iter: 1 value: -194.5932 mgc: 0.005642532 ustep: 1
## iter: 2 value: -194.5932 mgc: 3.477519e-08 ustep: 1
## mgc: 8.432499e-11
## iter: 1 mgc: 8.432499e-11
## outer mgc: 4.039137e-05
## 70: 2473.7877: 5.54013 1.99169 5.64112 2.51671 5.32098 3.85612 3.83889 4.59838 7.38127 5
## iter: 1 mgc: 8.432499e-11

## converged: relative convergence (4)

## Order of parameters:
## [1] "log_tau2_logpop_f" "log_tau2_logpop_m" "log_tau2_fx" "log_tau2"
## [5] "log_tau2_gx_m" "log_basepop_f" "log_basepop_m" "log_fx"
## [9] "gx_f" "gx_m" "logit_rho_g_x_f" "logit_rho_g_x"
## [13] "logit_rho_g_t_f" "logit_rho_g_t_m" "log_lambda_tp" "log_lambda_tp"
## [17] "tp_params" "log_dispersion_f" "log_dispersion_m" "log_phi"
## [21] "log_phi_innov_m" "log_psi_innov_f" "log_psi_innov_m" "log_lambda"
## [25] "log_lambda_innov_m" "log_delta_innov_f" "log_delta_innov_m" "log_epsilon"
## [29] "log_epsilon_innov_m" "log_A_innov_f" "log_A_innov_m" "log_B_innov_m"
## [33] "log_B_innov_m" "log_phi_f" "log_phi_m" "log_psi"
## [37] "log_psi_m" "log_lambda_f" "log_lambda_m" "log_delta"
## [41] "log_delta_m" "log_epsilon_f" "log_epsilon_m" "log_A_f"
## [45] "log_A_m" "log_B_f" "log_B_m" "log_marginal"
## [49] "log_marginal_prec_phi_m" "log_marginal_prec_psi_f" "log_marginal_prec_psi_m" "log_marginal_prec_phi"
## [53] "log_marginal_prec_lambda_m" "log_marginal_prec_delta_f" "log_marginal_prec_delta_m" "log_marginal_prec_lambda"
## [57] "log_marginal_prec_epsilon_m" "log_marginal_prec_A_f" "log_marginal_prec_A_m" "log_marginal_prec_epsilon"
## [61] "log_marginal_prec_B_m" "logit_rho_phi_f" "logit_rho_phi_m" "logit_rho_phi"
## [65] "logit_rho_psi_m" "logit_rho_lambda_f" "logit_rho_lambda_m" "logit_rho_psi"
## [69] "logit_rho_delta_m" "logit_rho_epsilon_f" "logit_rho_epsilon_m" "logit_rho_delta"
## [73] "logit_rho_A_m" "logit_rho_B_f" "logit_rho_B_m" "logit_rho_A"

## Not matching template order:
## [1] "log_tau2_logpop_f" "log_tau2_logpop_m" "log_tau2_fx" "log_tau2"
## [5] "log_tau2_gx_m" "logit_rho_g_x_f" "logit_rho_g_t_f" "logit_rho_g_x"
## [9] "logit_rho_g_t_m" "log_basepop_f" "log_basepop_m" "log_fx"
## [13] "gx_f" "gx_m" "log_lambda_tp" "log_lambda"
## [17] "log_dispersion_f" "log_dispersion_m" "tp_params" "log_phi"
## [21] "log_psi_f" "log_lambda_f" "log_delta_f" "log_epsilon"
## [25] "log_A_f" "log_B_f" "log_phi_m" "log_psi"
## [29] "log_lambda_m" "log_delta_m" "log_epsilon_m" "log_A_m"
## [33] "log_B_m" "log_marginal_prec_phi_f" "log_marginal_prec_psi_f" "log_marginal_prec_phi"
## [37] "log_marginal_prec_delta_f" "log_marginal_prec_epsilon_f" "log_marginal_prec_A_f" "log_marginal_prec_delta"

```

```

## [41] "log_marginal_prec_phi_m"      "log_marginal_prec_psi_m"      "log_marginal_prec_lambda_m"  "log_mar
## [45] "log_marginal_prec_epsilon_m"  "log_marginal_prec_A_m"        "log_marginal_prec_B_m"       "logit_r
## [49] "logit_rho_psi_f"              "logit_rho_A_f"                "logit_rho_B_f"               "logit_r
## [53] "logit_rho_psi_m"              "logit_rho_A_m"                "logit_rho_B_m"
## Your parameter list has been re-ordered.
## (Disable this warning with checkParameterOrder=FALSE)

##      user  system elapsed
##  56.61    1.49   58.60

## [1] "relative convergence (4)"

```

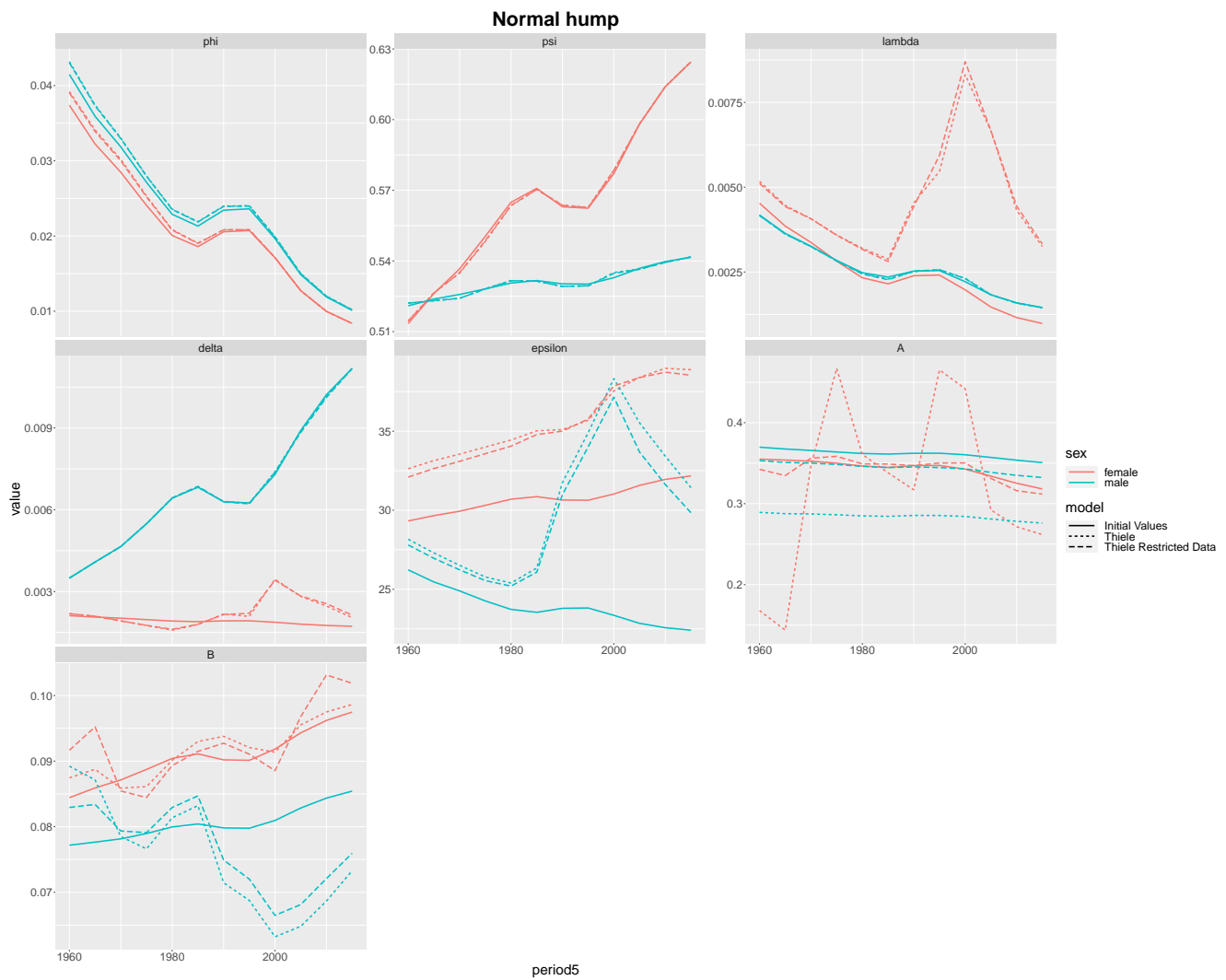


Figure 1: Estimated parameters

```
## Using Sex as id variables
## Using Sex as id variables

## Warning: Removed 20 rows containing missing values (geom_point).
## Warning: Removed 20 rows containing missing values (geom_point).
## Warning: Removed 20 rows containing missing values (geom_point).
## Warning: Removed 20 rows containing missing values (geom_point).
## Warning: Removed 20 rows containing missing values (geom_point).
```

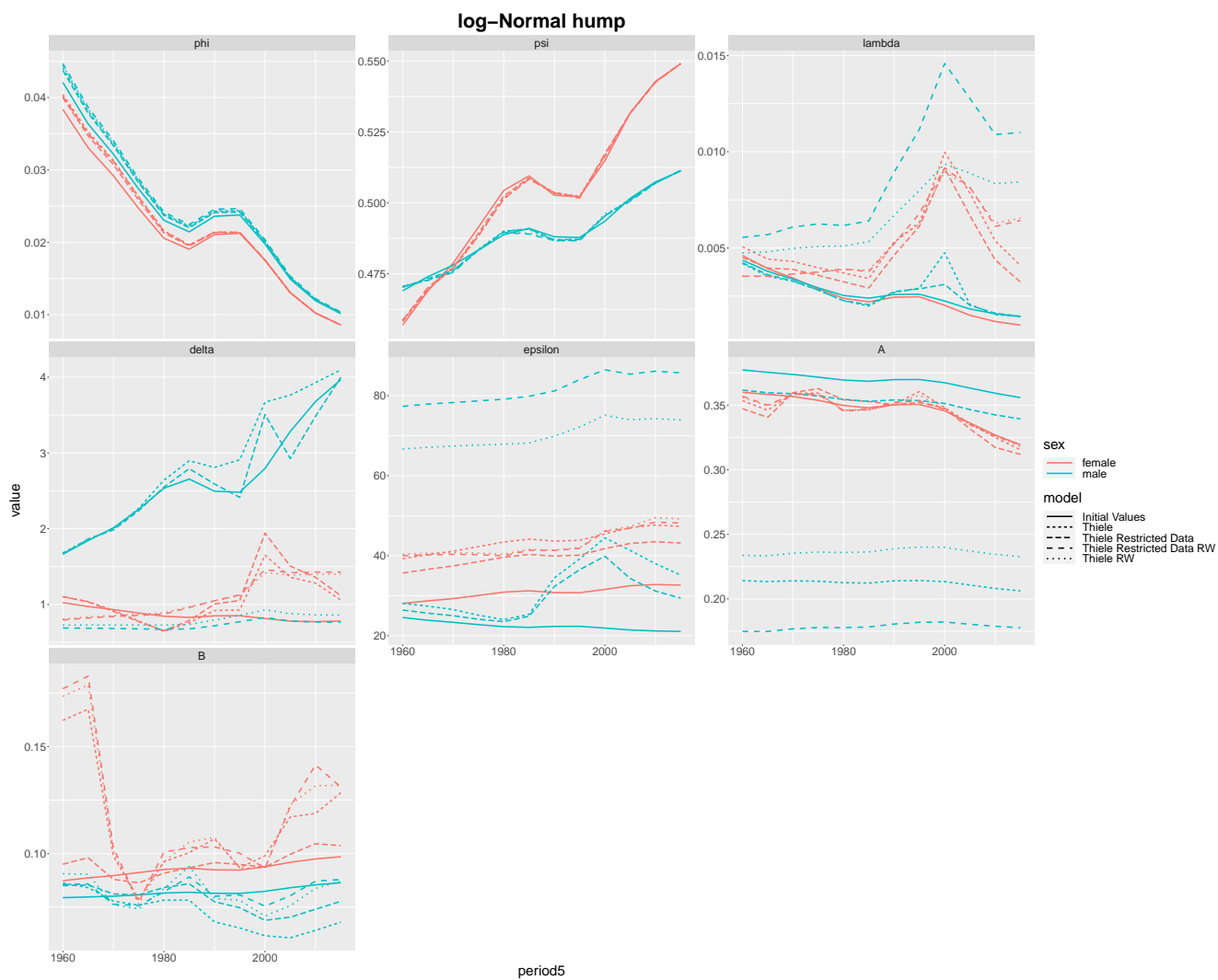


Figure 2: Estimated parameters

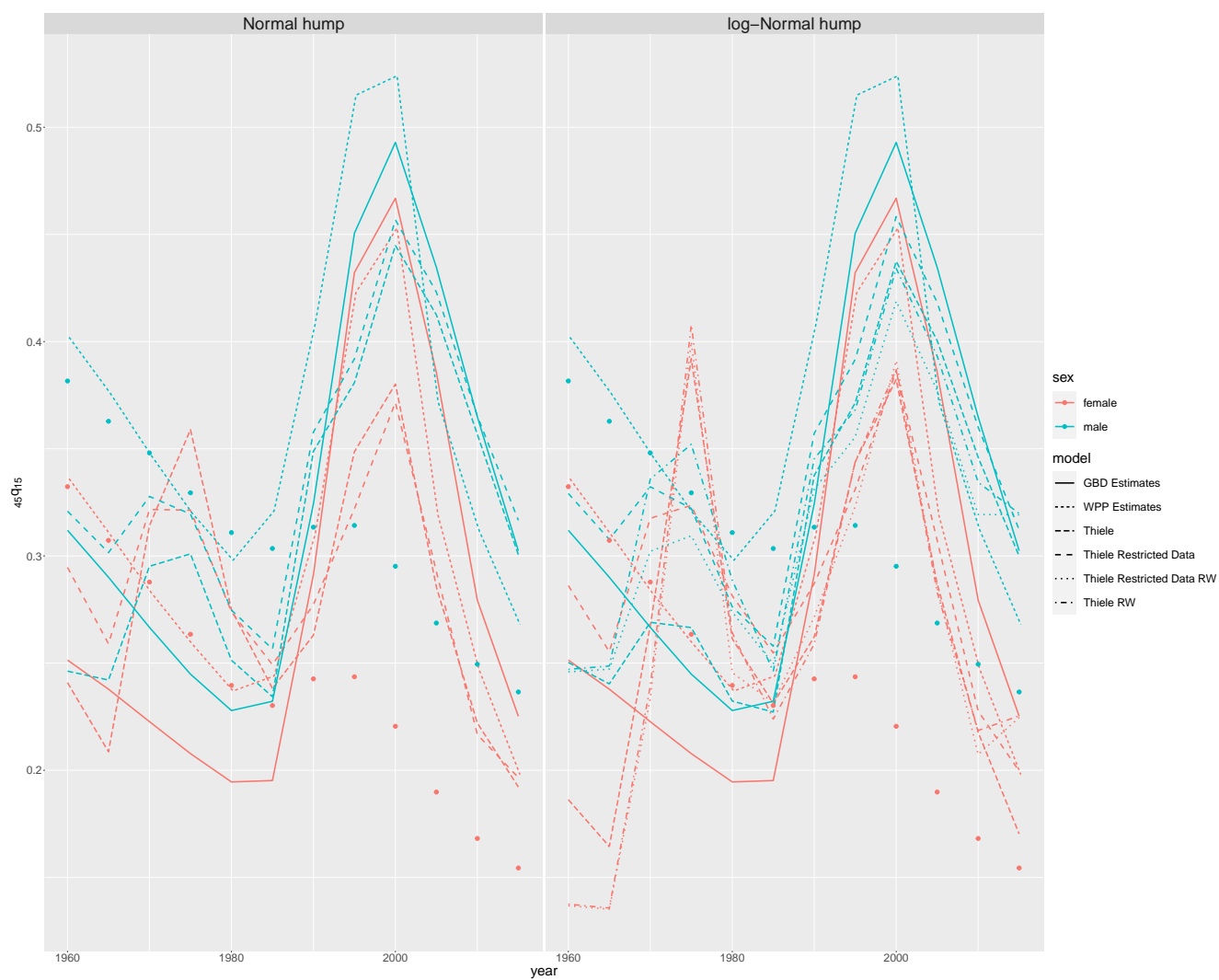


Figure 3: Estimated  $_{45}q_{15}$

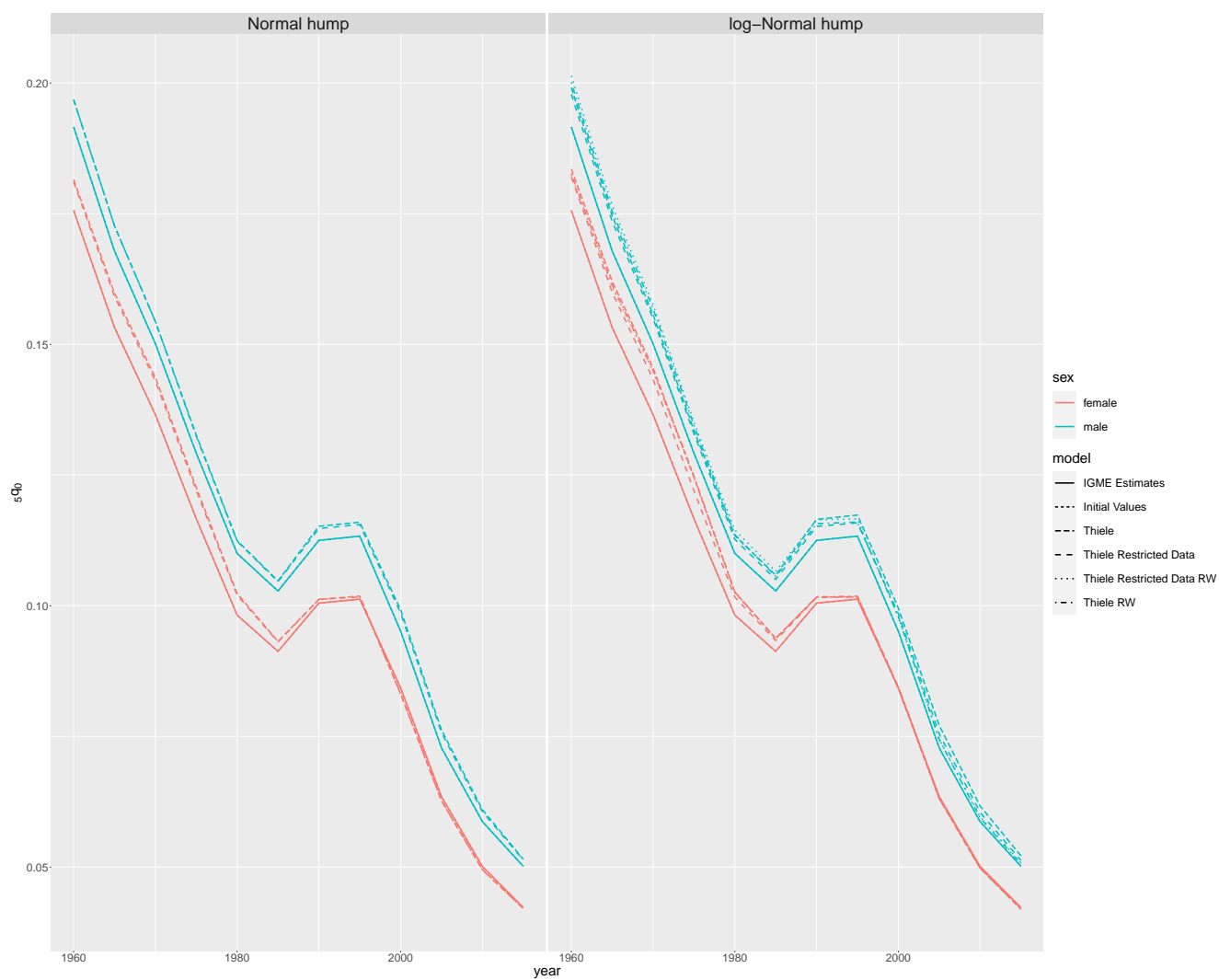


Figure 4: Estimated  ${}_5q_0$

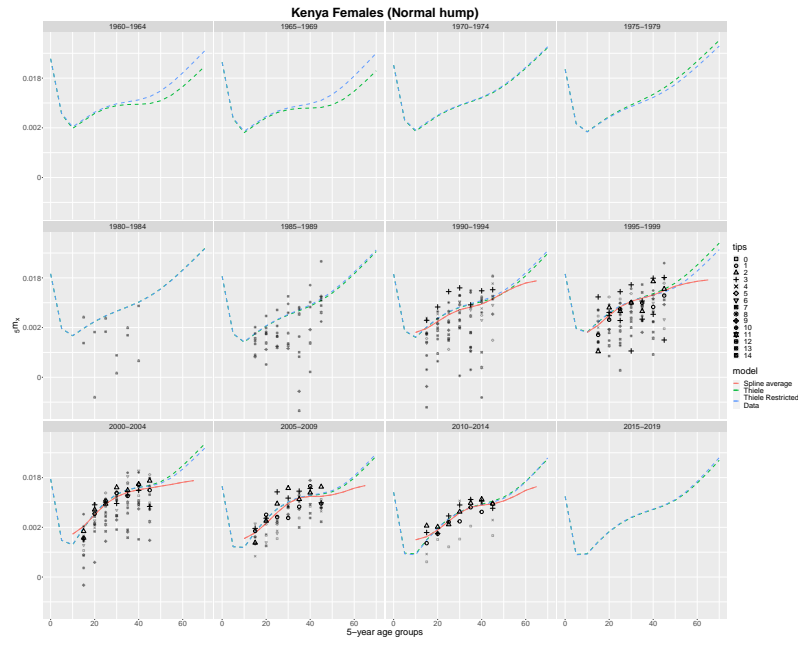


Figure 5: Mortality Schedules

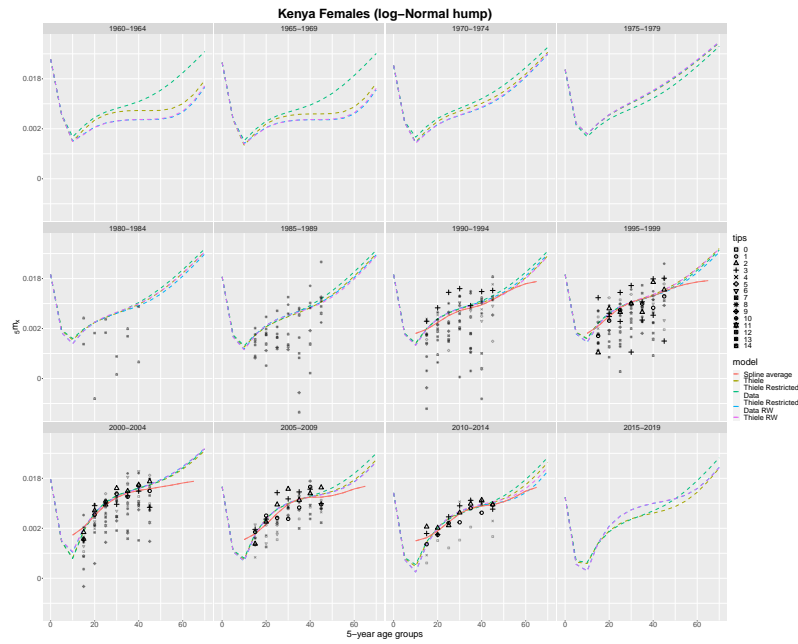


Figure 6: Mortality Schedules

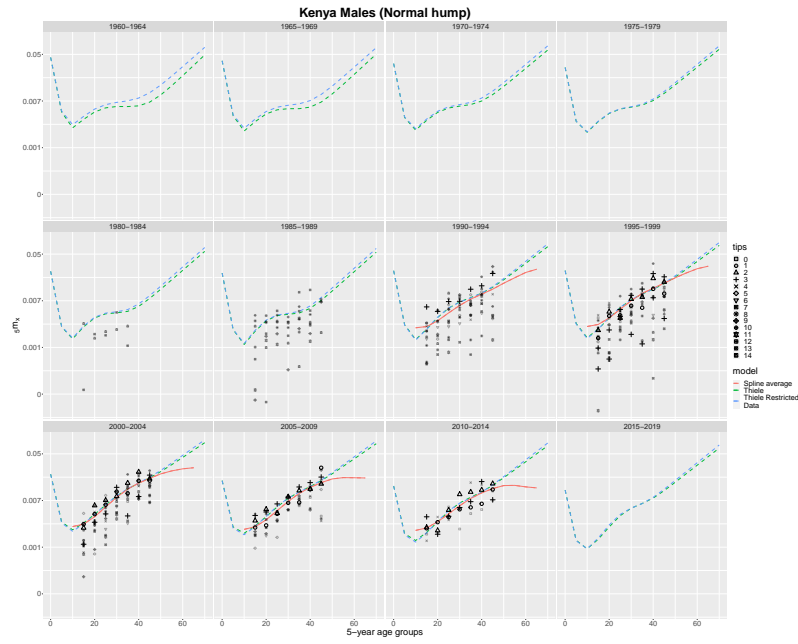


Figure 7: Mortality Schedules

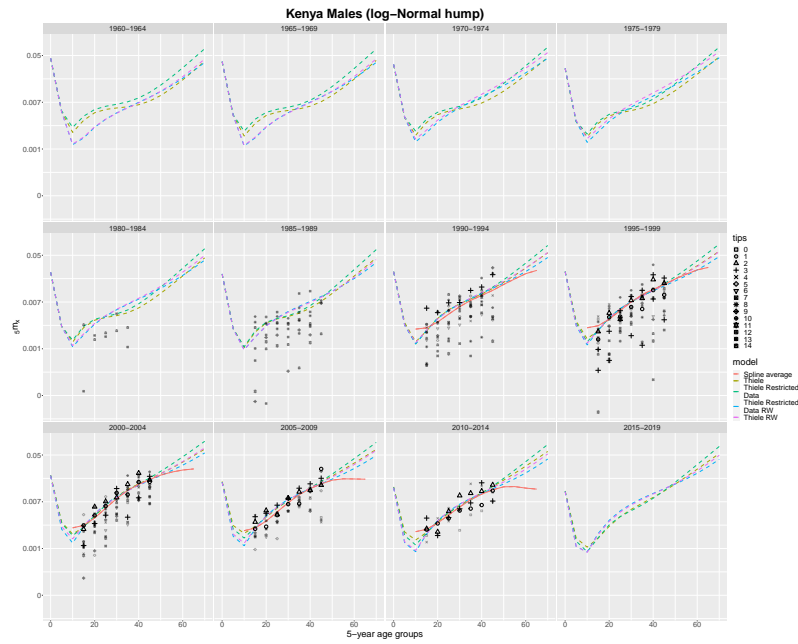


Figure 8: Mortality Schedules



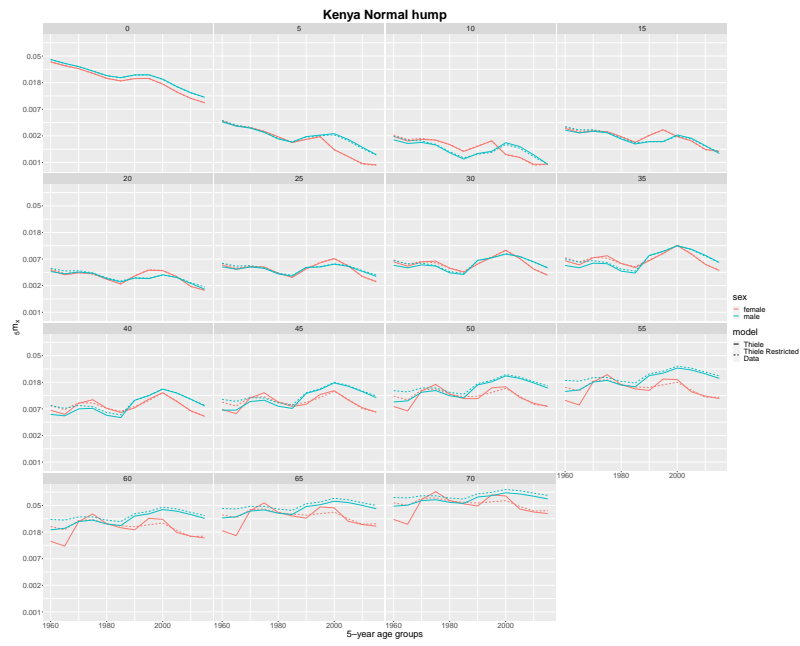


Figure 9: Mortality Schedules

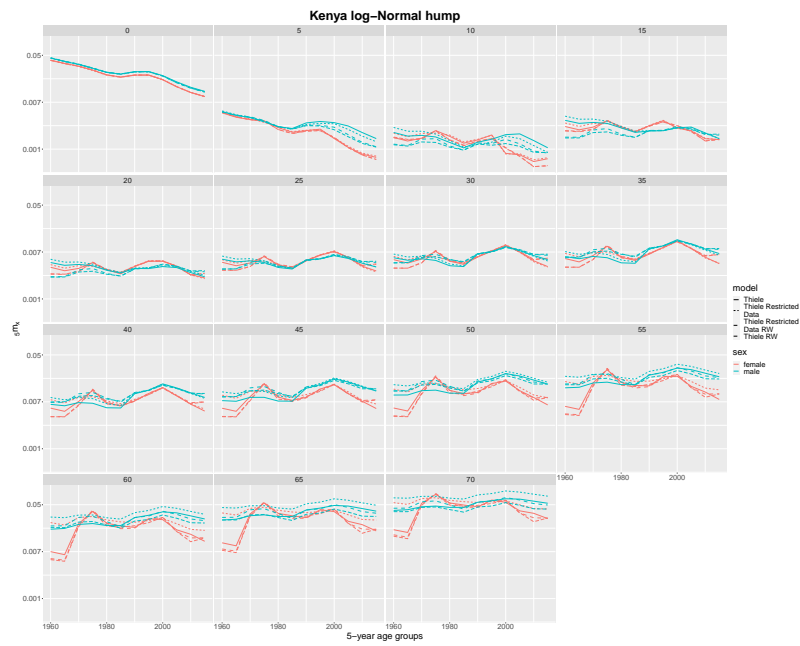


Figure 10: Mortality Schedules

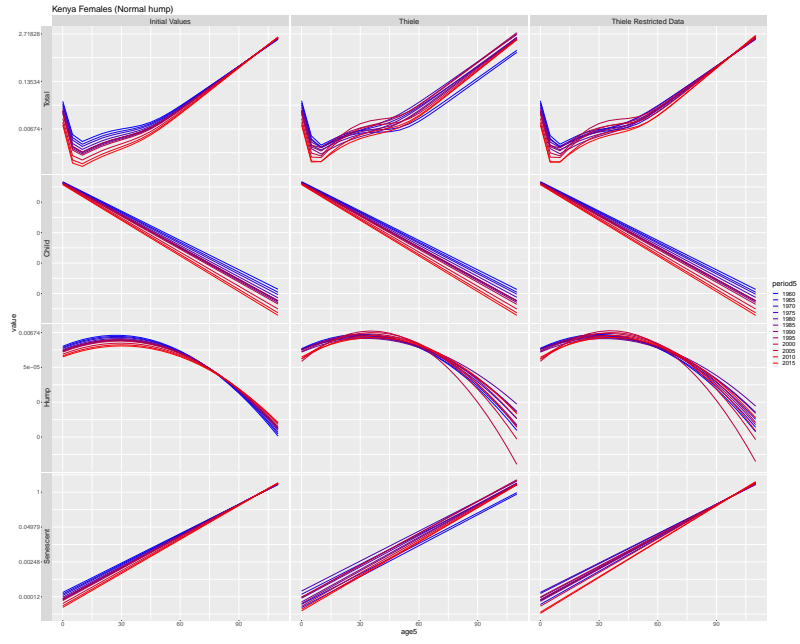


Figure 11: Thiele Decomposed

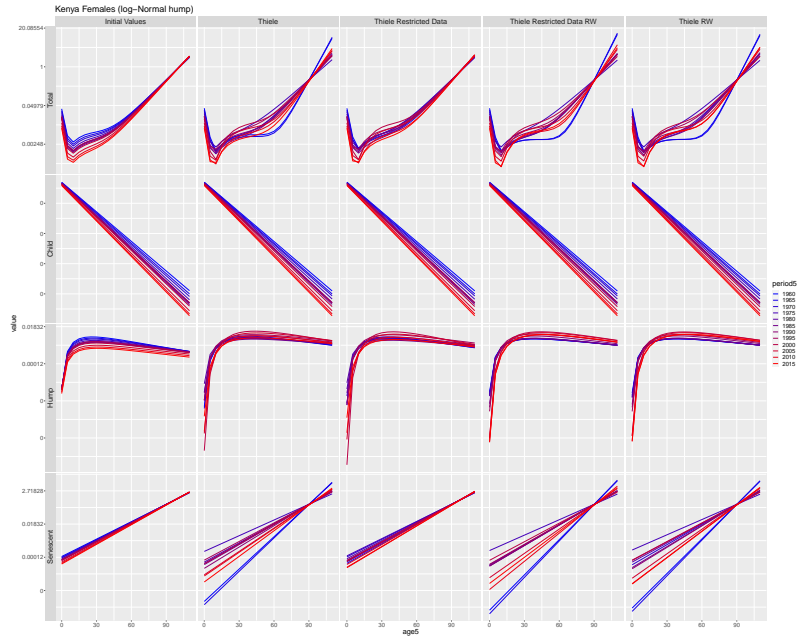


Figure 12: Thiele Decomposed

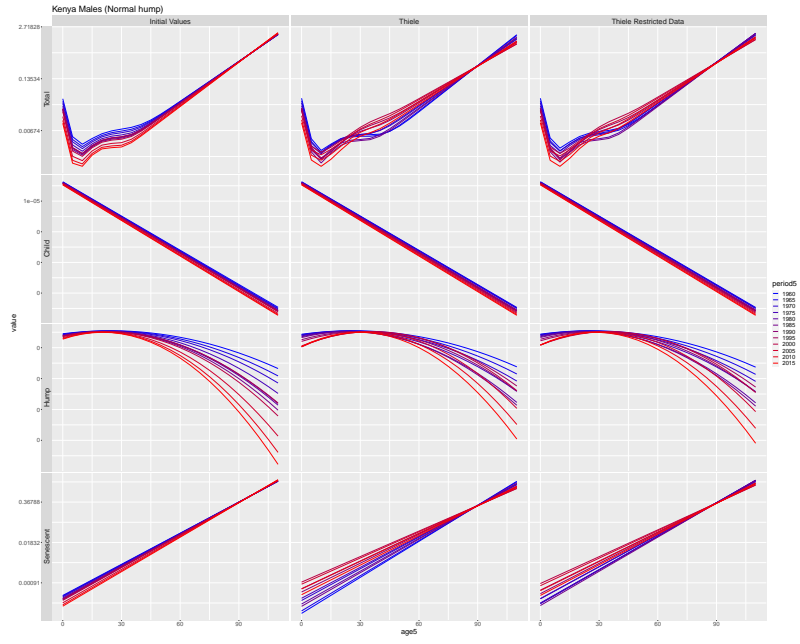


Figure 13: Thiele Decomposed

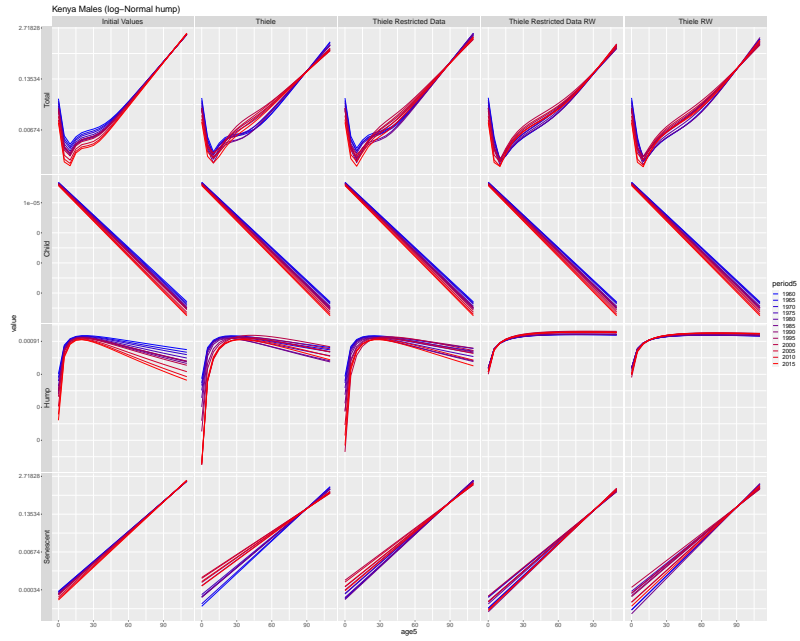


Figure 14: Thiele Decomposed

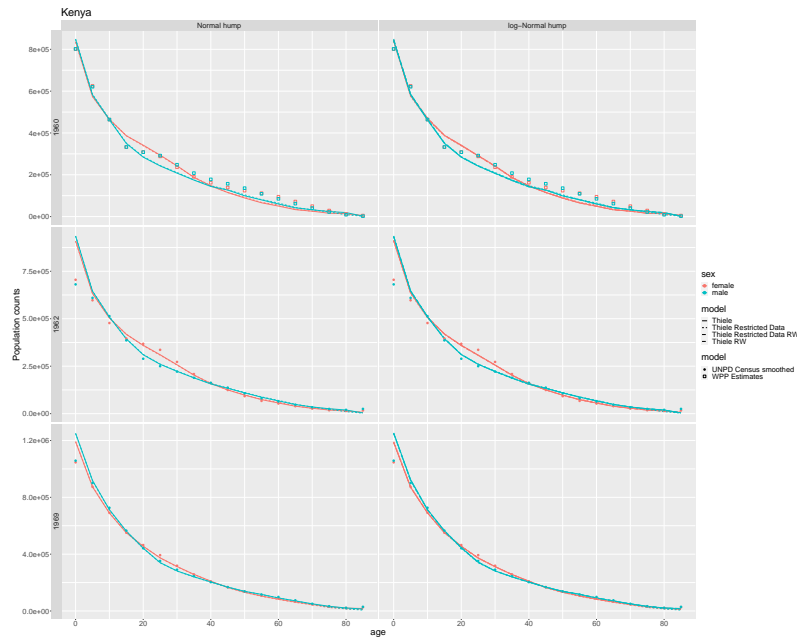


Figure 15: Population

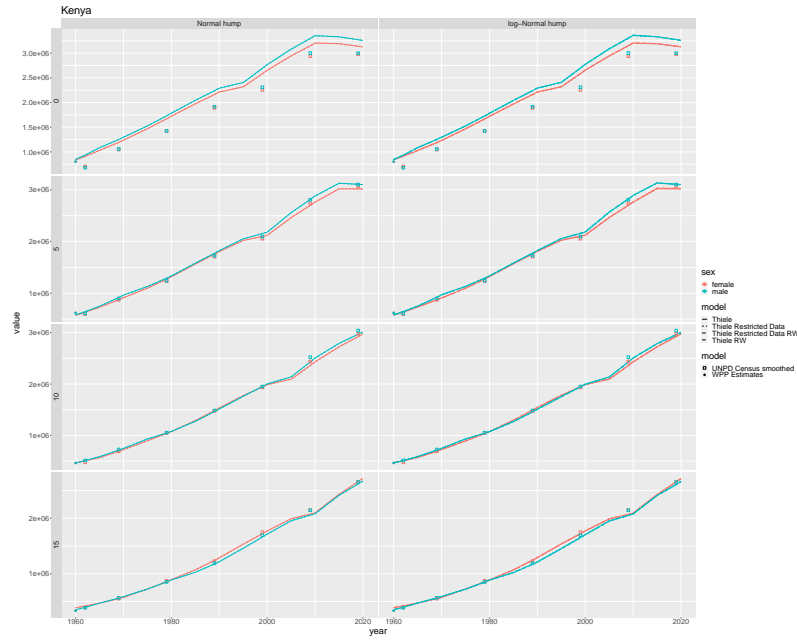


Figure 16: Population

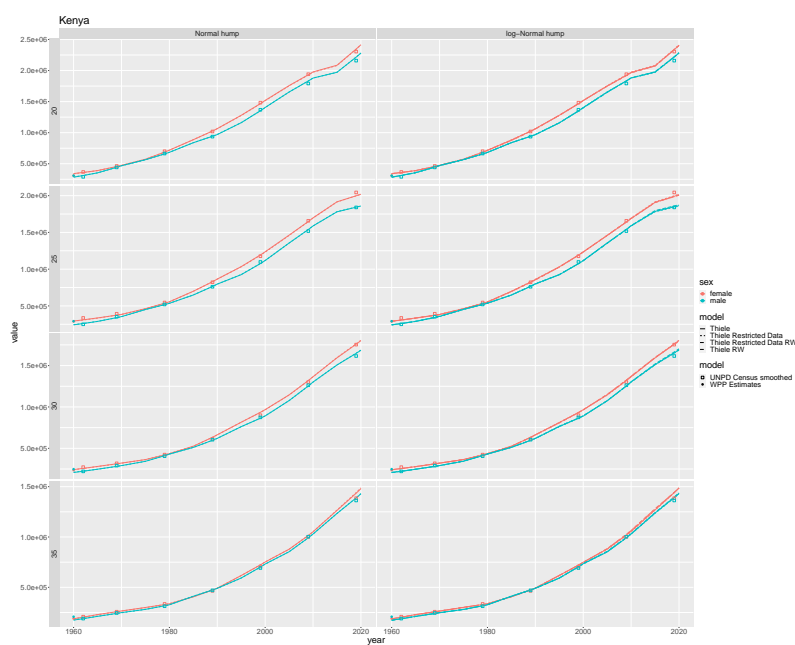


Figure 17: Population

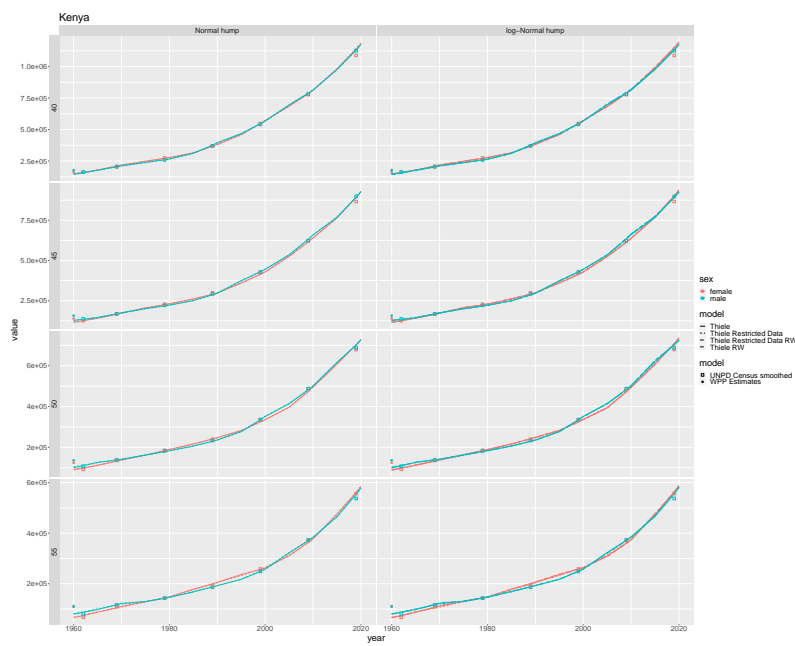


Figure 18: Population

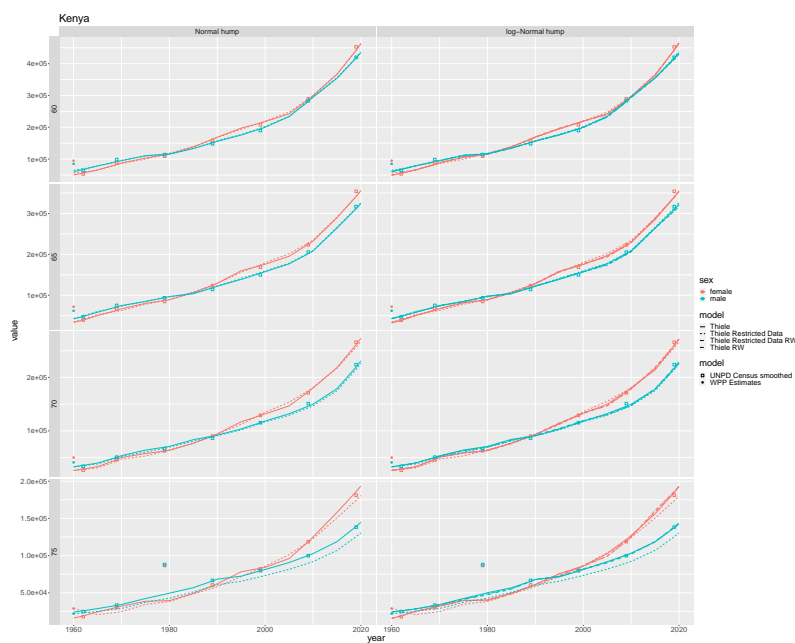


Figure 19: Population

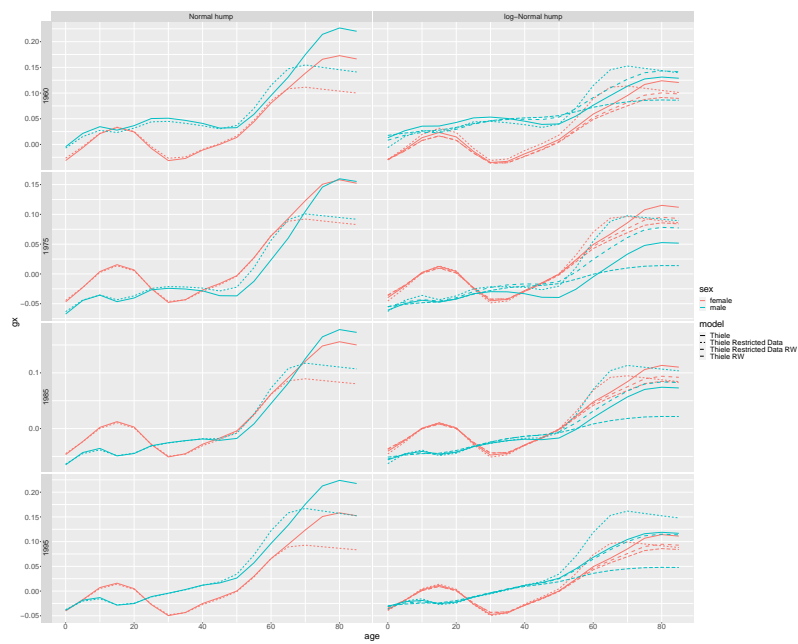


Figure 20: Migration



Figure 21: Migration

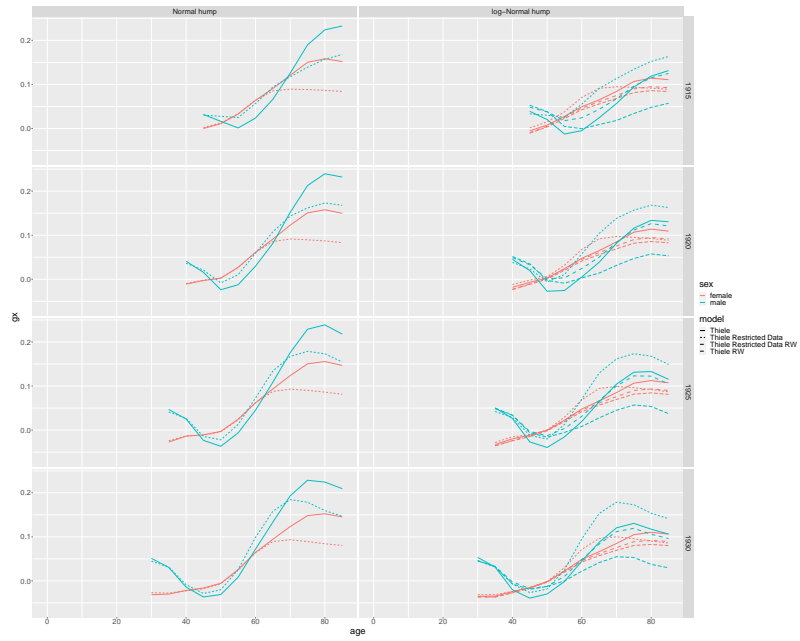


Figure 22: Migration

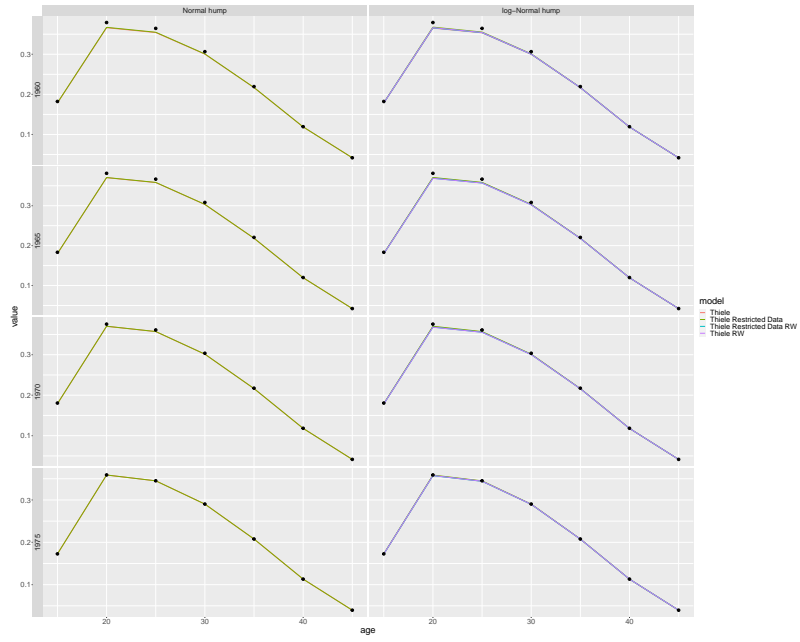


Figure 23: Fertility

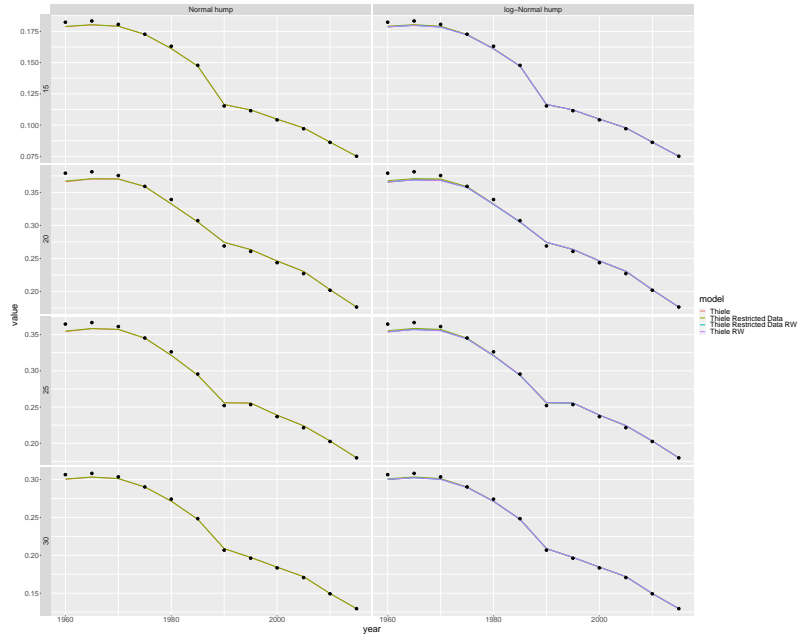


Figure 24: Fertility