BauchModel_DefaultTest_NoMovement

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28 March, 2023, 11:54

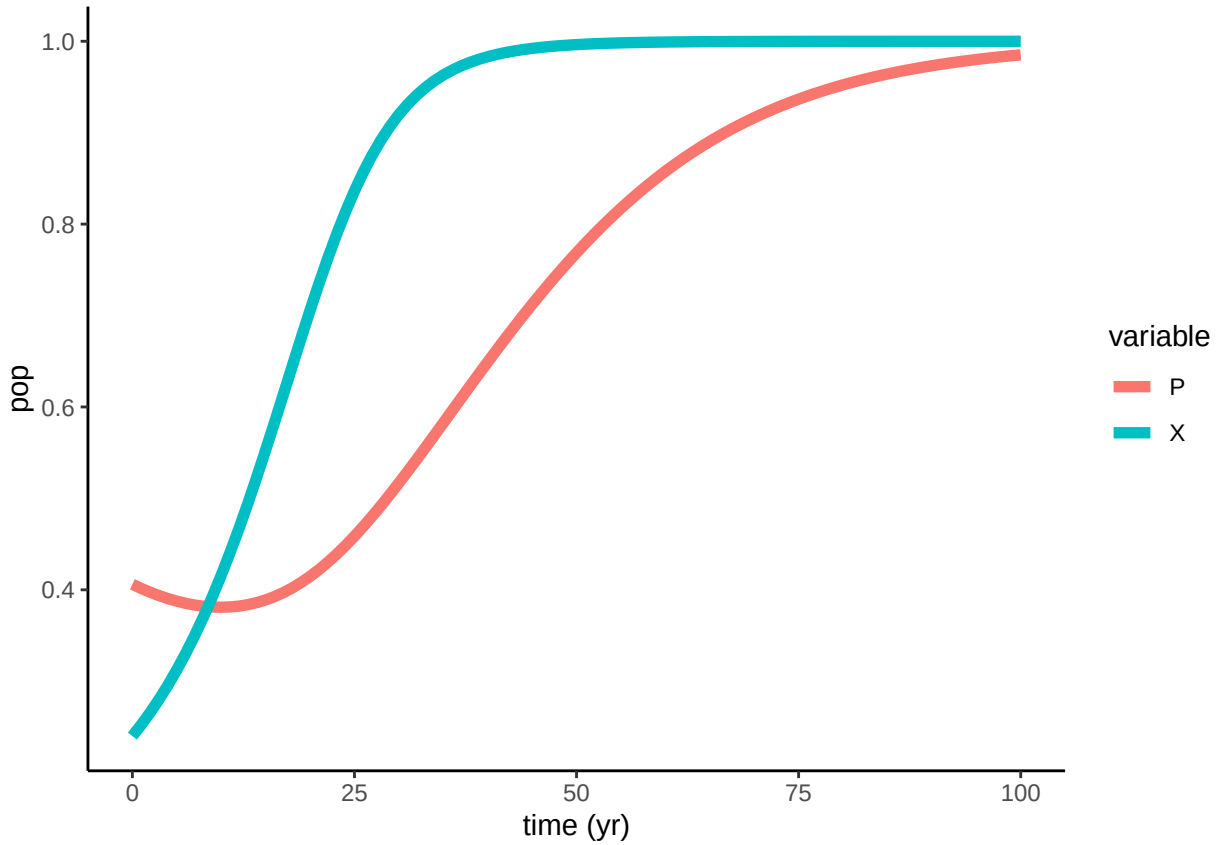

Figure 1: Original Bauch Model

Table 1: Parameter values used in this analysis

Parameter	Population_1	Population_2	Def
r	0.35	0.35	Fish net growth
s	0.8	0.8	Supply and demand
h	0.5	0.5	Harvesting efficiency
k	1.014	1.014	Social learning rate
w	0.35	0.35	Conservation cost
c	1.68	1.68	Rarity valuation
d	0.2	0.2	Social norm strength (within pop)
e	0	0	Fish emigration (from patch)
i	0	0	Fish immigration (from opposite patch)
prop	0.1	0.1	Social norm strength (opposite pop)

Table 2: Starting values used in this analysis

Parameter	Population_1	Population_2
F	0.406	0.406
X	0.240	0.240

SCENARIO: DEFAULTS TEST WITH NO MOVEMENT

Function:

$\frac{dP_1}{dt} = r_1 P_1(1 - P_1) - \frac{h_1 * P_1(1-X_1)}{P_1+s_1} - e_1 P_1 + i_1 P_2$

$\frac{dP_2}{dt} = r_2 P_2(1 - P_2) - \frac{h_2 * P_2(1-X_2)}{P_2+s_2} - e_2 P_2 + i_2 P_1$

$\frac{dX_1}{dt} = k_1 X_1(1 - X_1)[\frac{1}{P_1+c_1} - w_1 + d_1(2X_1 - 1) + prop_1(2X_2 - 1)]$

$\frac{dX_2}{dt} = k_2 X_2(1 - X_2)[\frac{1}{P_2+c_2} - w_2 + d_2(2X_2 - 1) + prop_2(2X_1 - 1)]$

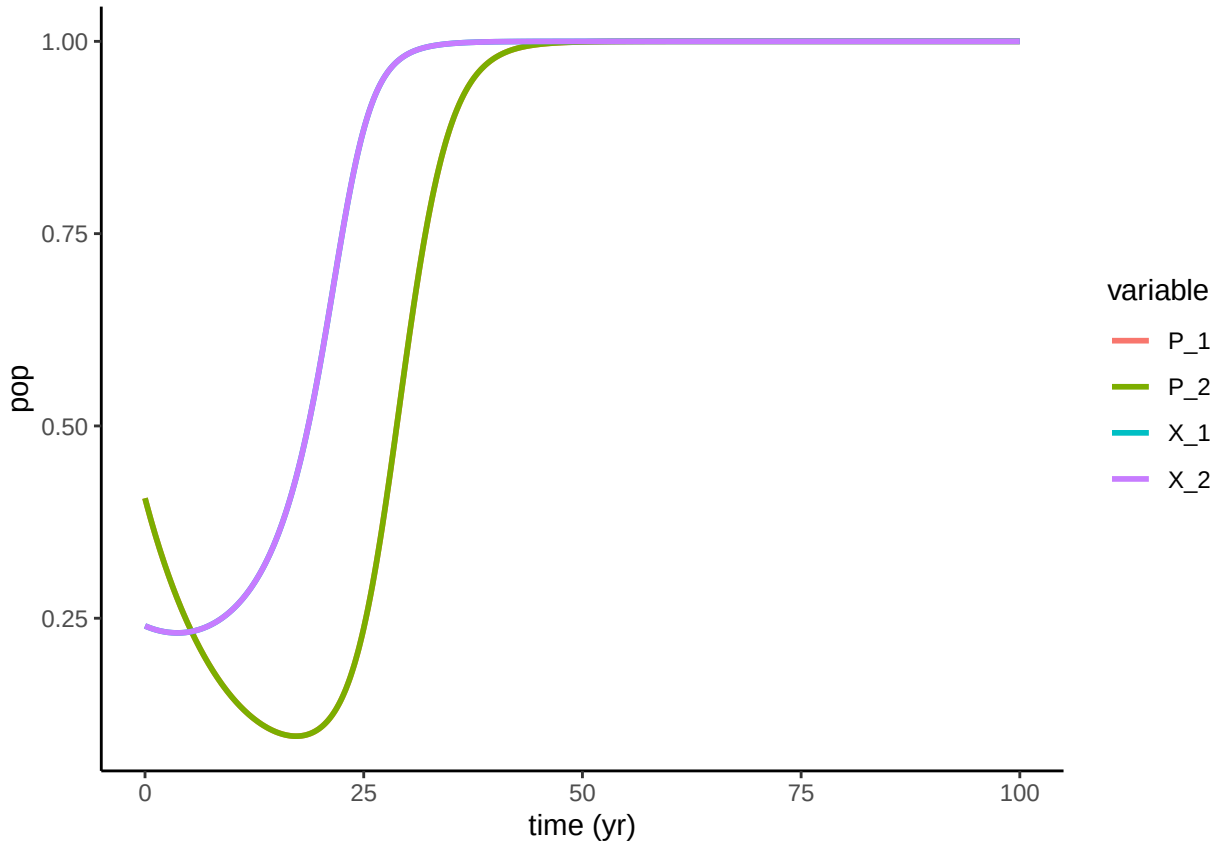

Figure 2: New Model with default paramters

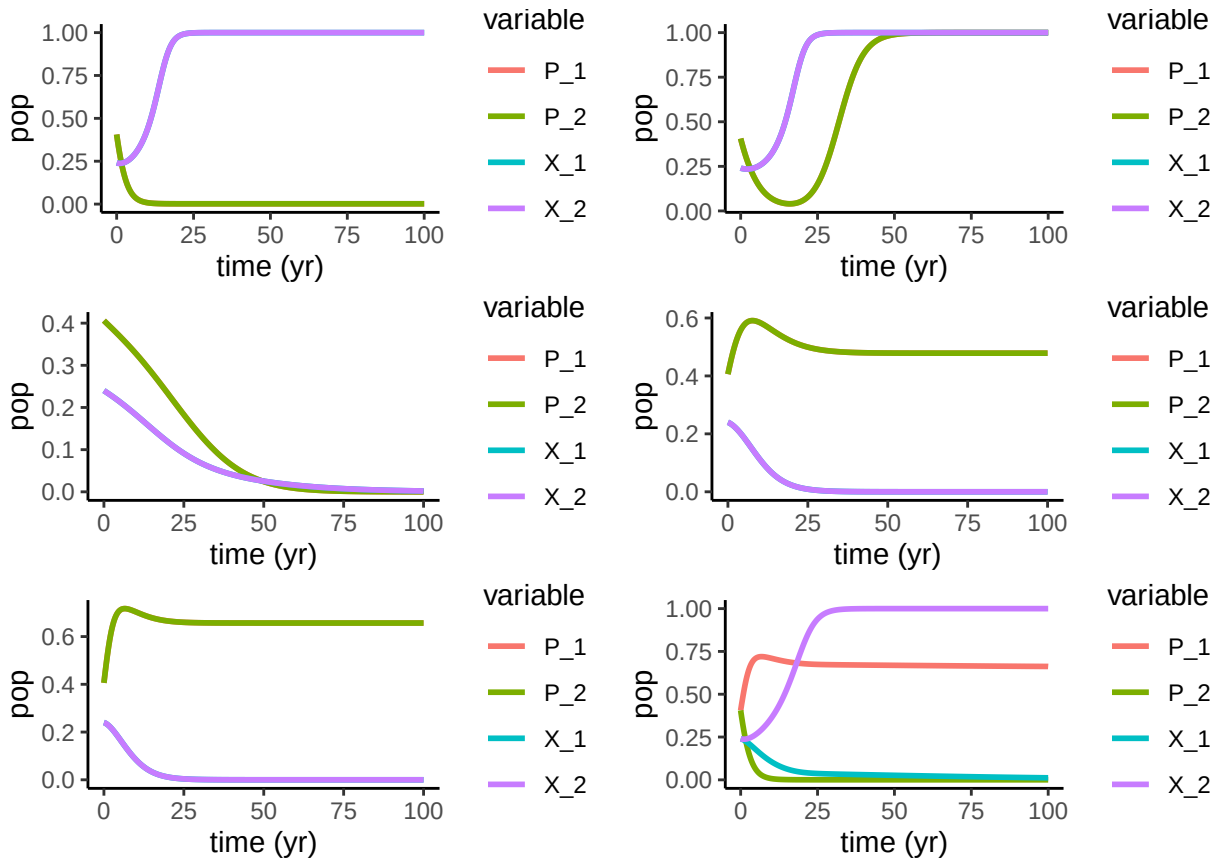

Figure 3: R - Net growth/fecundity, range 0 to 1

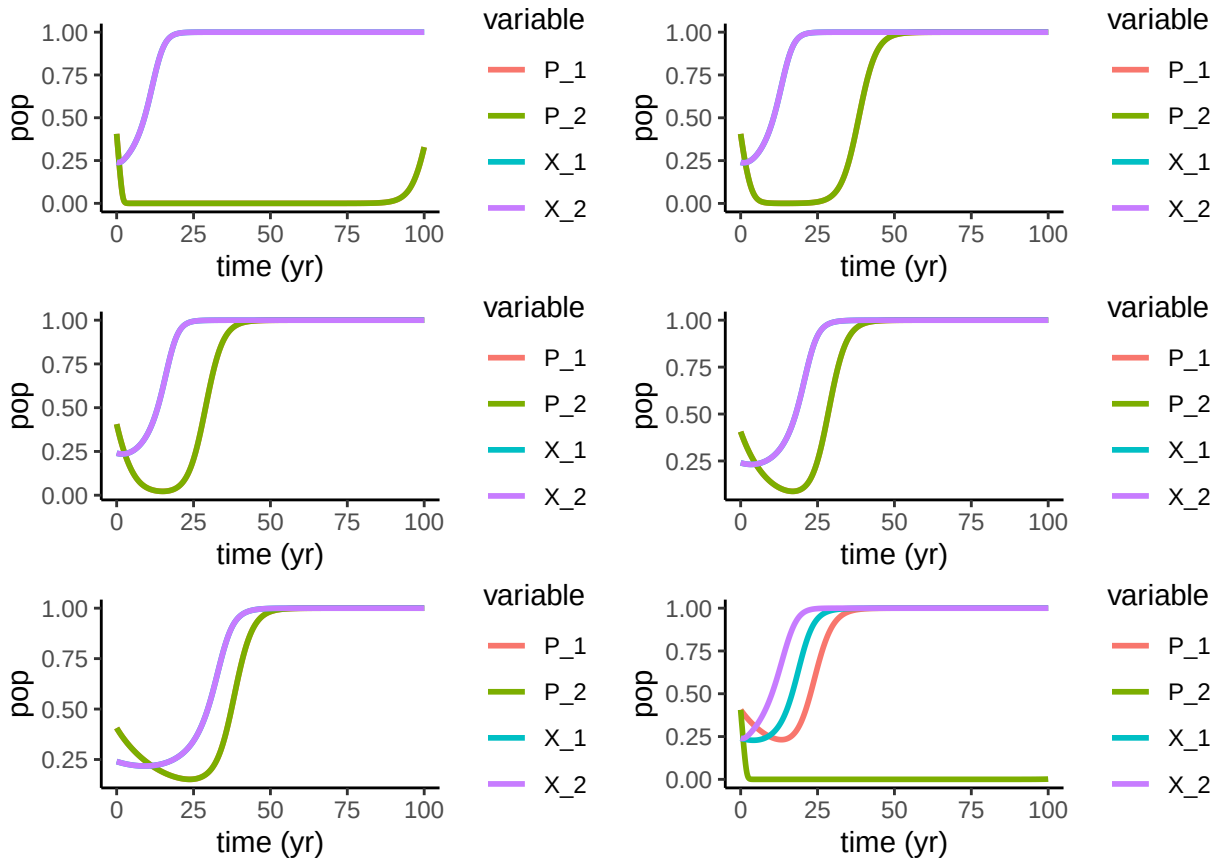

Figure 4: S - supply and demand, range 0.1 to 1

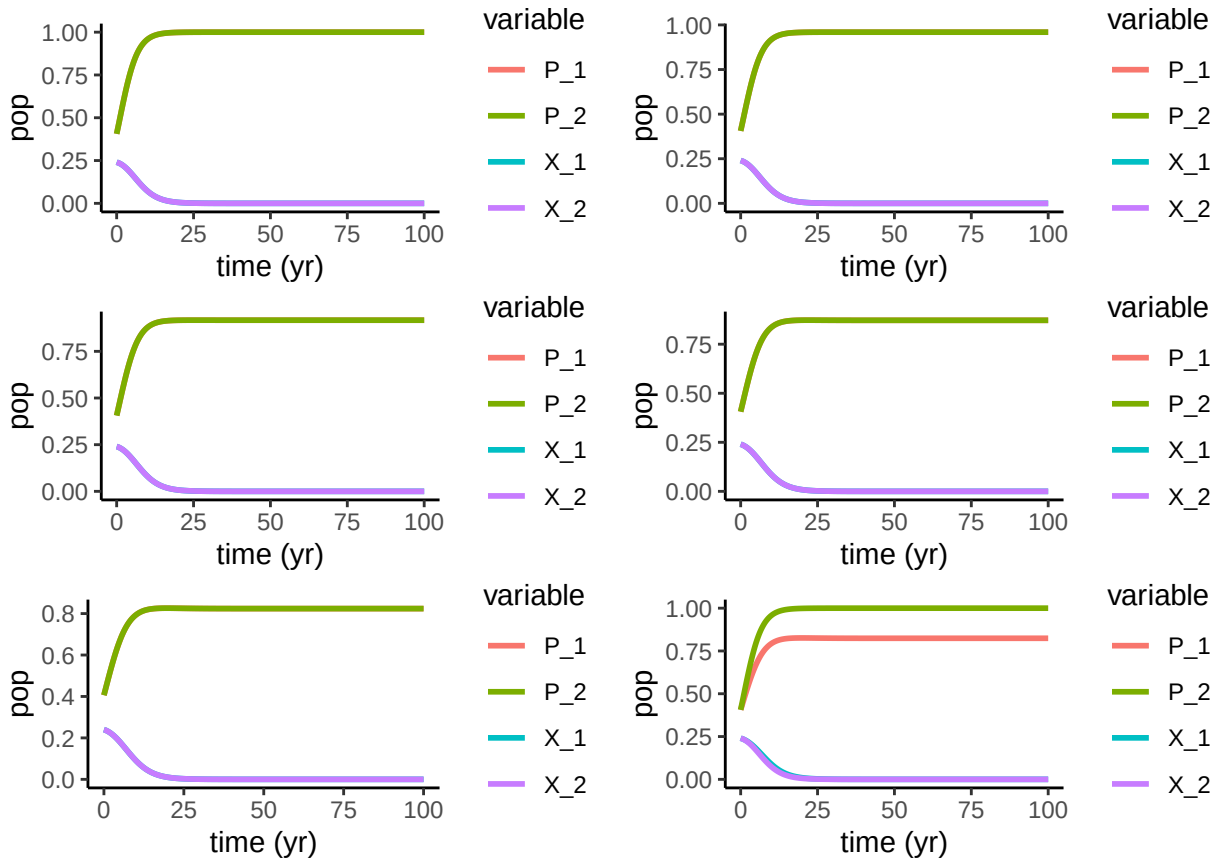

Figure 5: h - Harvesting efficiency, range 0 to 0.1. Note, default is .075

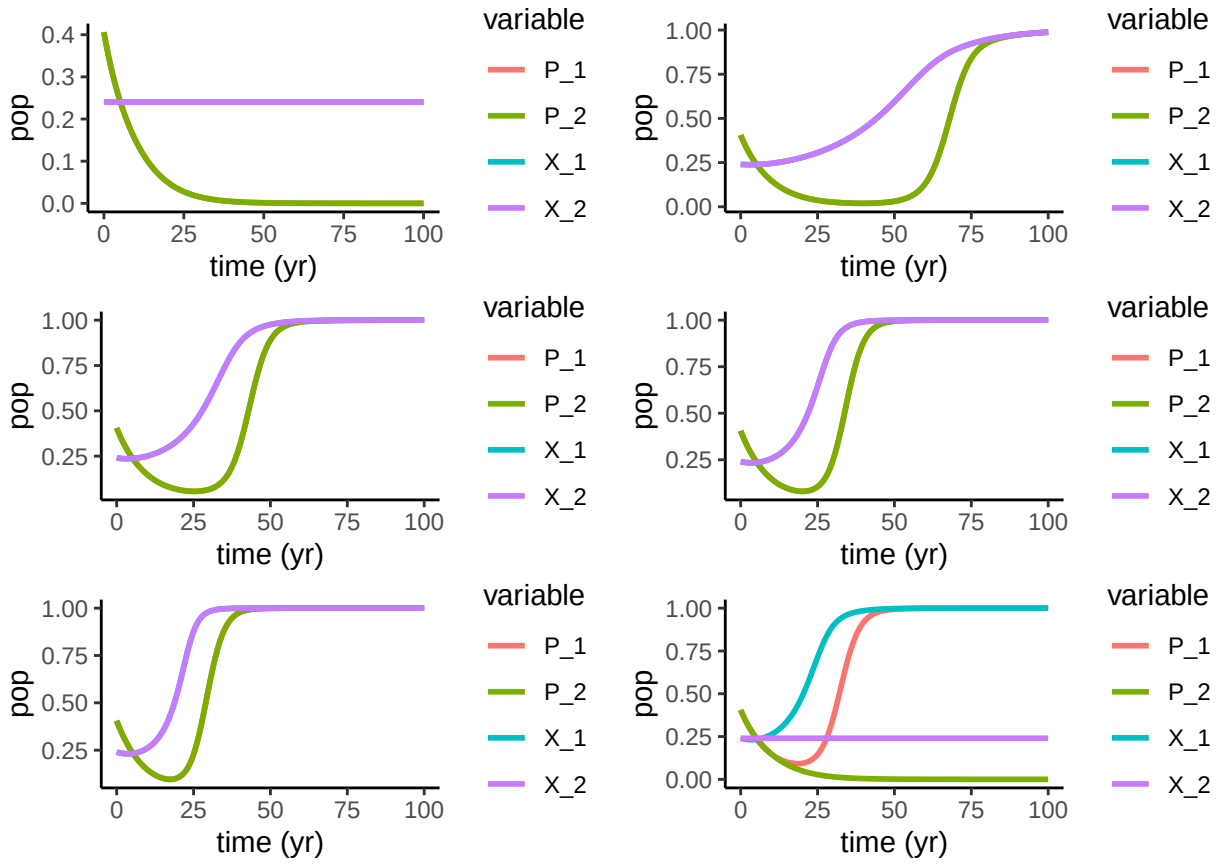

Figure 6: K - Social learning rate 0 to 1

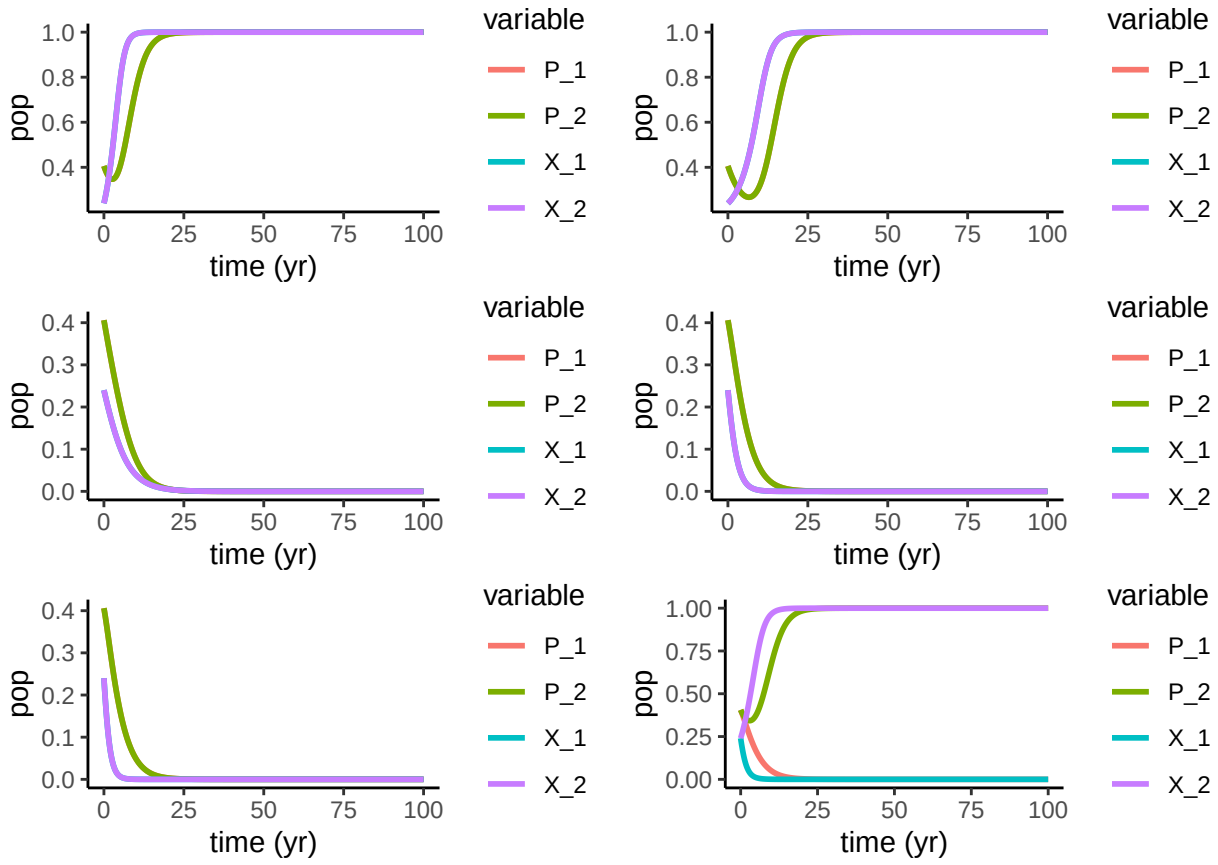

Figure 7: w - conservation costs

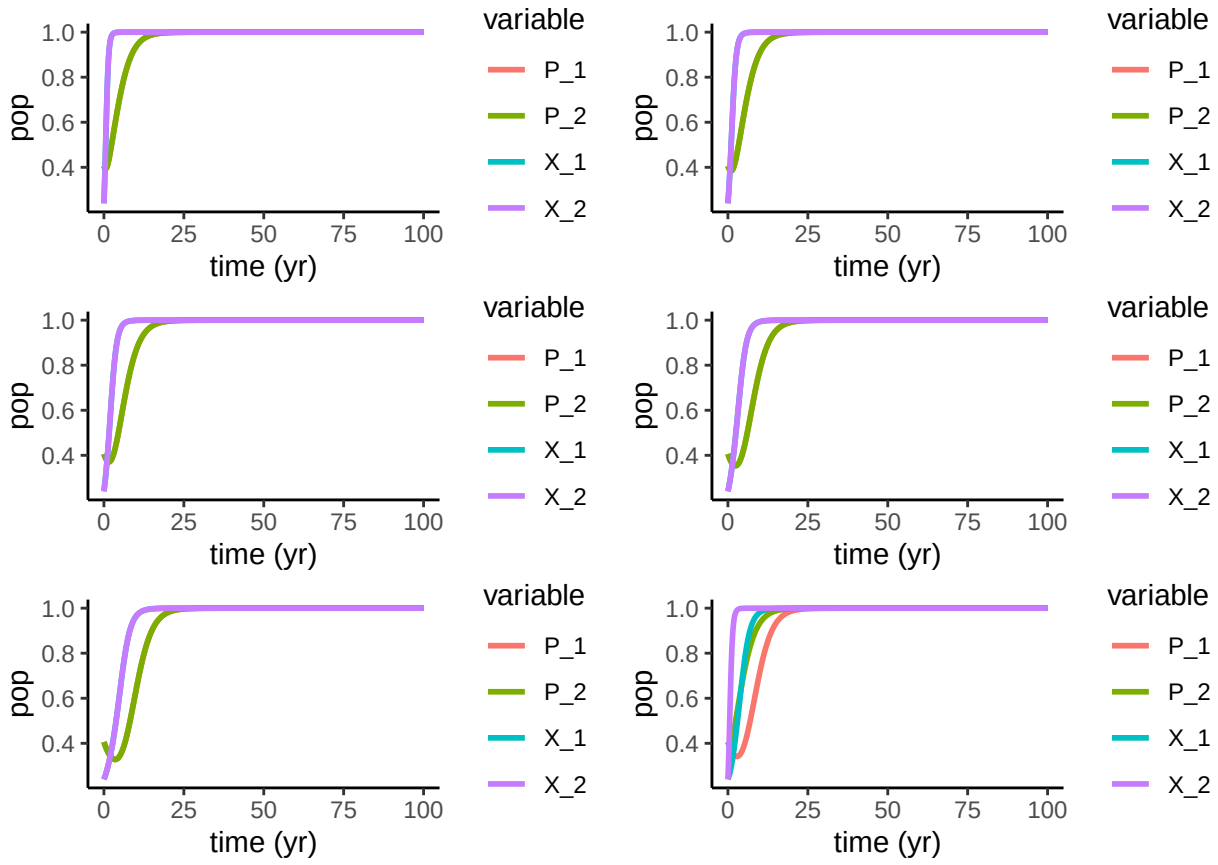

Figure 8: c - rarity valuation param

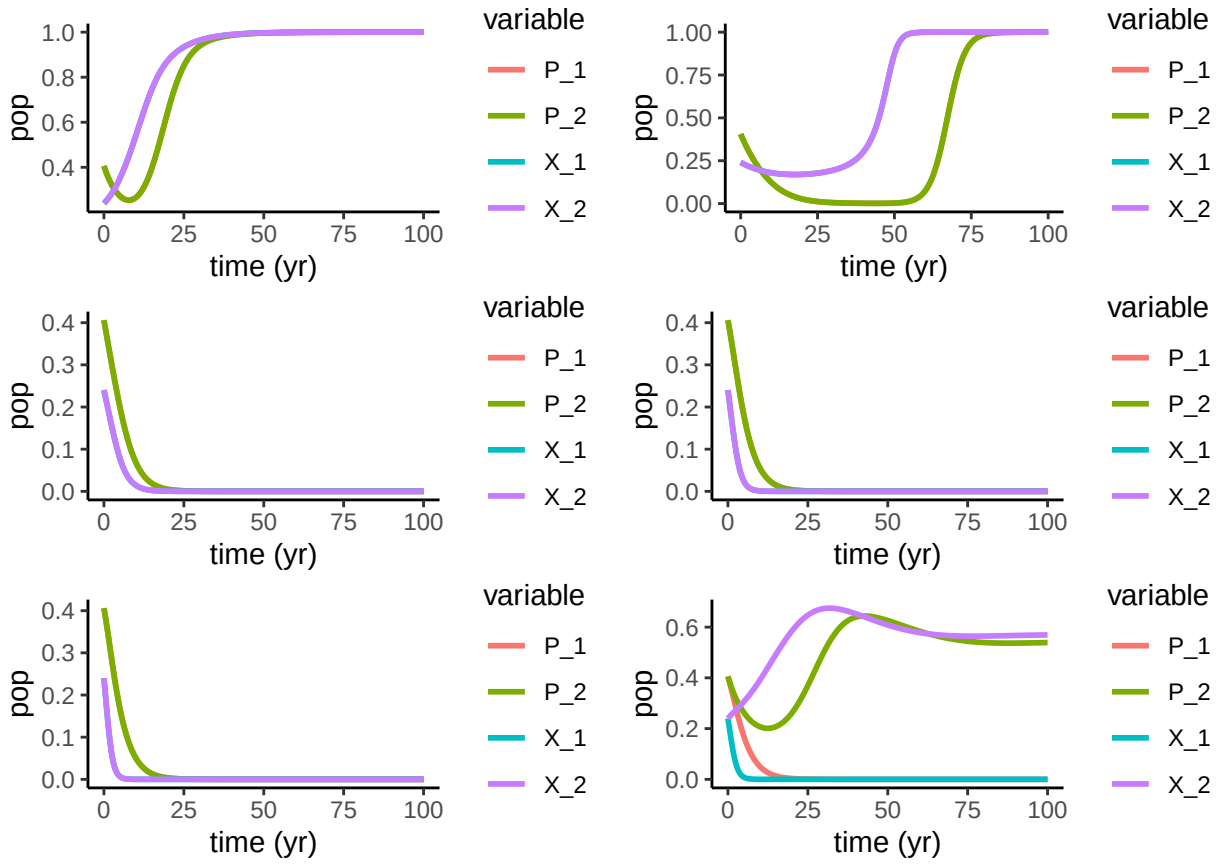

Figure 9: d - social norm strength

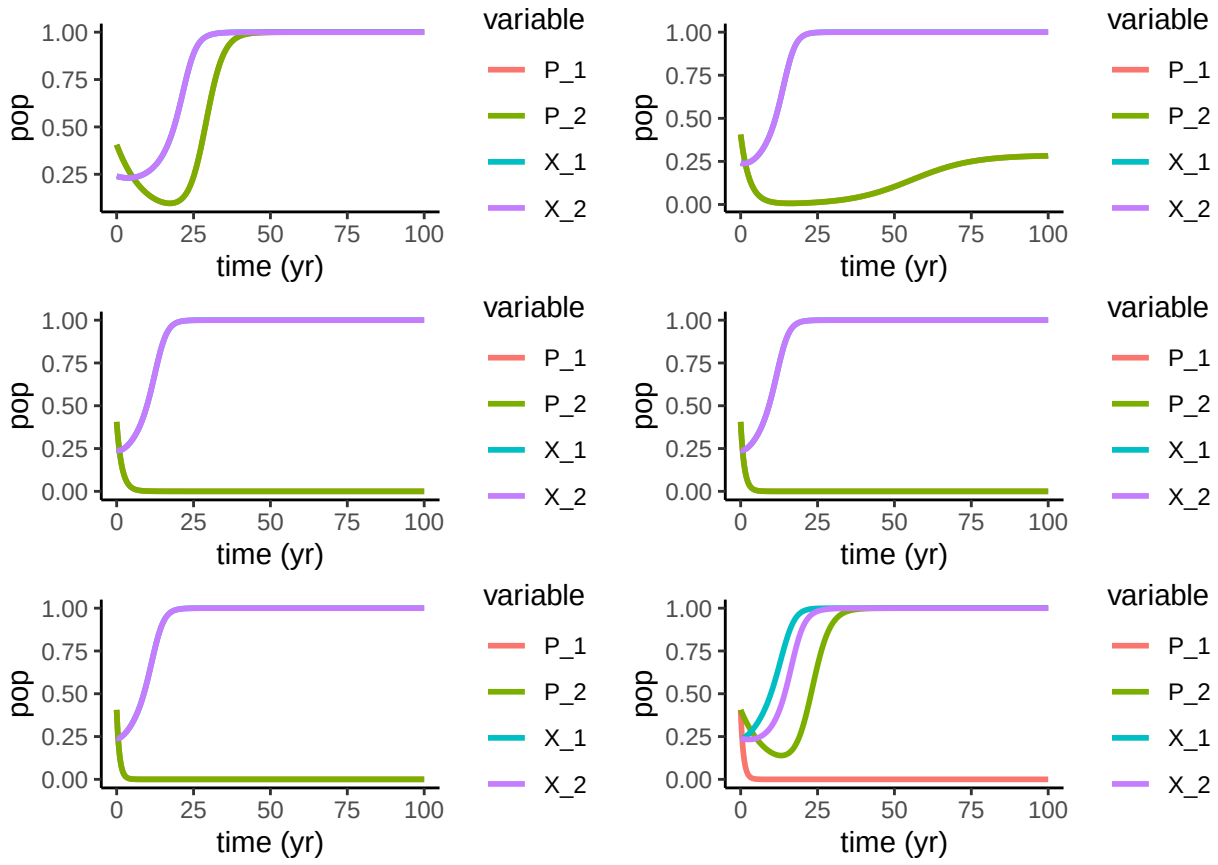

Figure 10: e - fish emigration

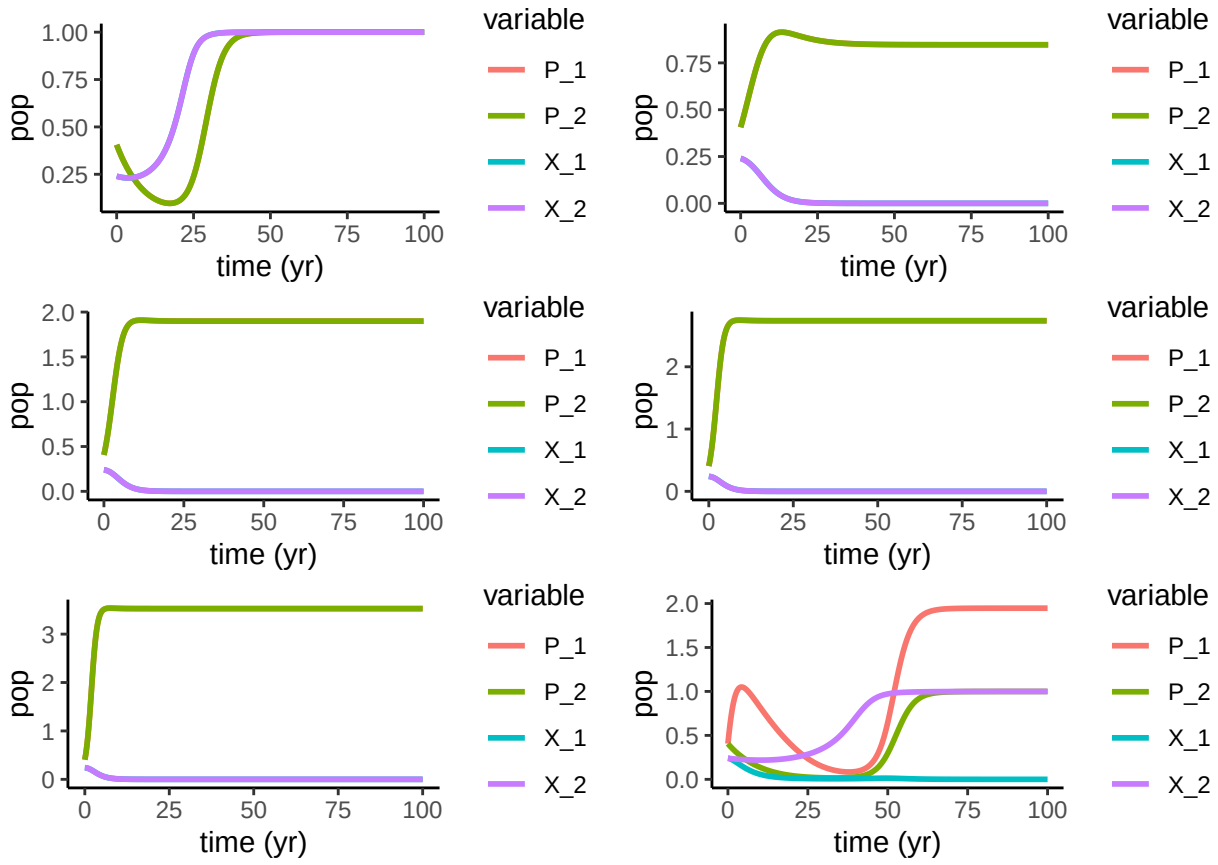

Figure 11: i - fish immigration

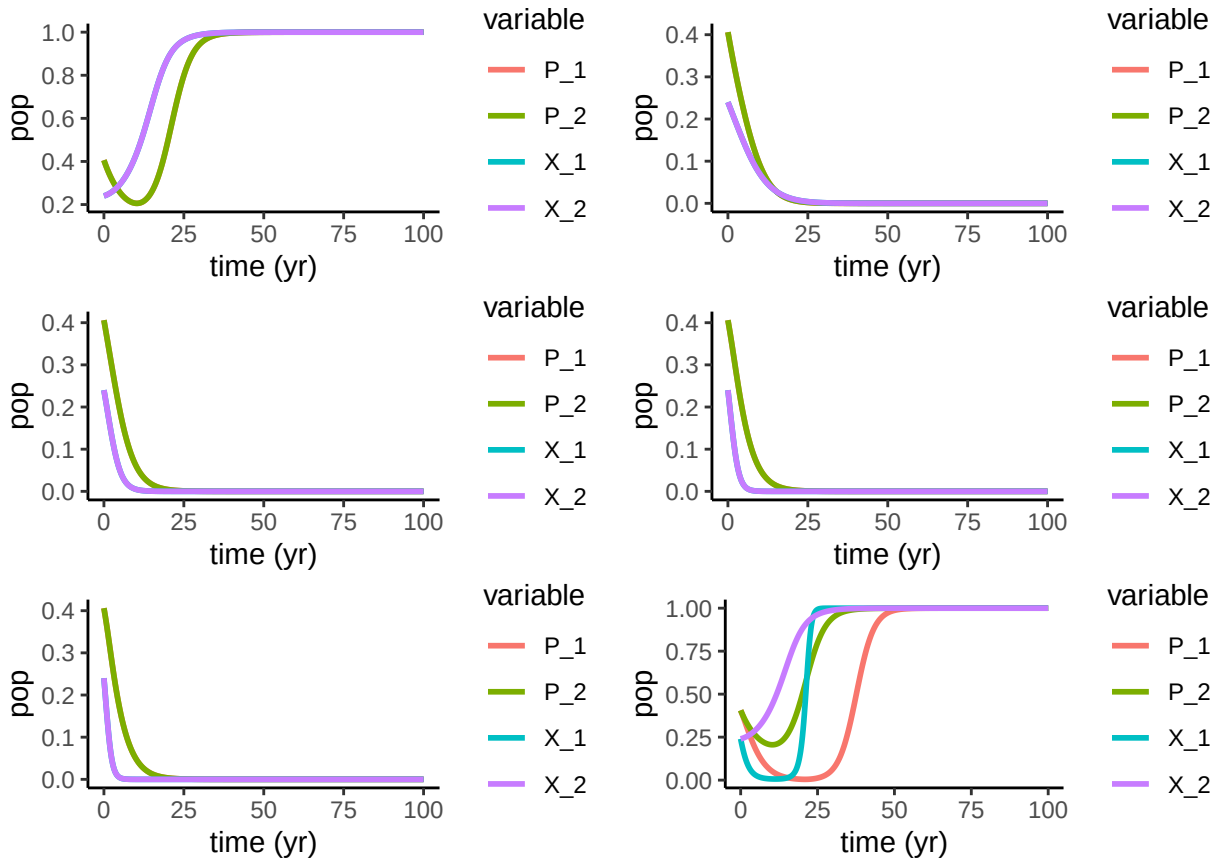

Figure 12: prop - Population influence on the other

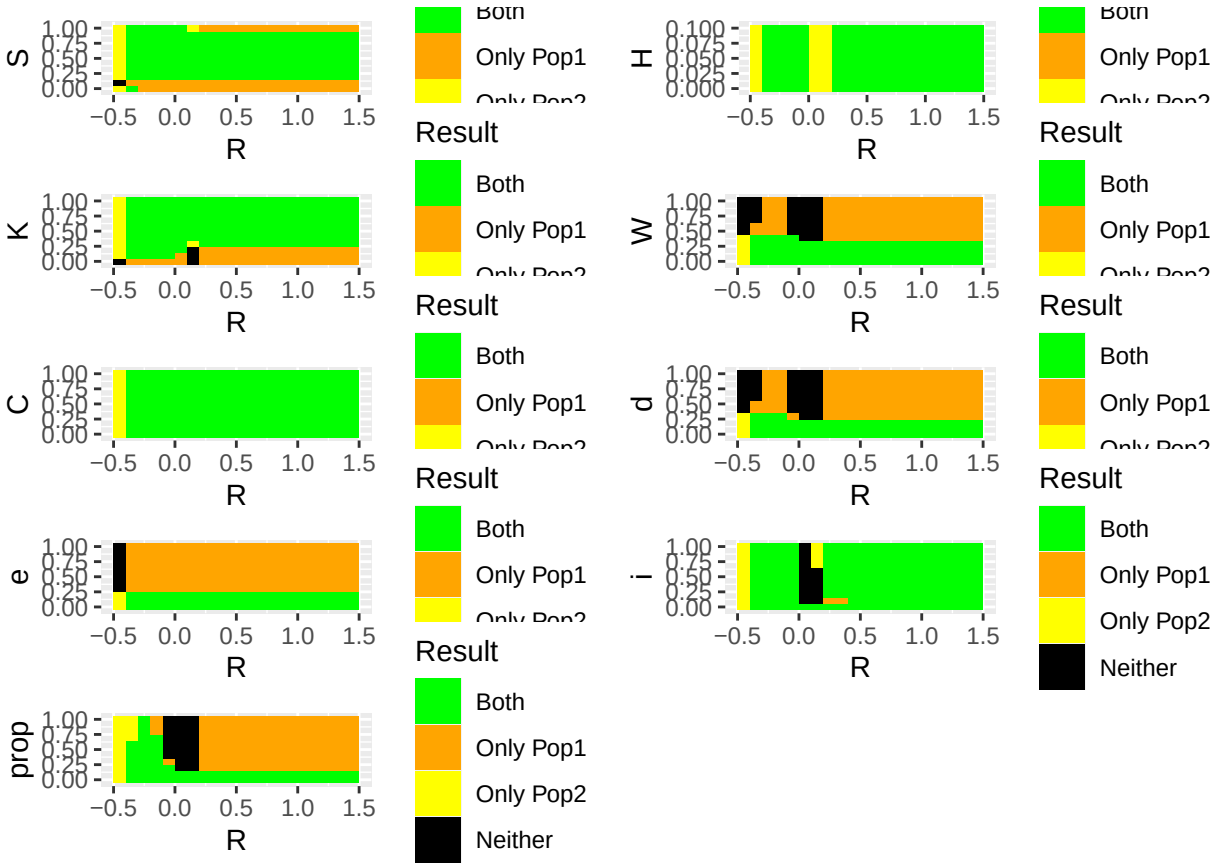

Figure 13: R parameter planes

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 6.56724e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 6.56724e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 5.4399e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 5.4399e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 5.4399e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 4.34865e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 4.34865e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 3.60215e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 3.60215e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 3.60215e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
```

```
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.4898
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 6.6434e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 6.6434e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 5.50298e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 5.50298e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 5.50298e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 4.39907e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 4.39907e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 3.64392e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 3.64392e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
```

```
## In above message, R1 = 98.2153, R2 = 3.64392e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.2153
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 6.37489e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 6.37489e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 5.28057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 5.28057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 5.28057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 4.22128e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 4.22128e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 3.49665e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
```

```
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 3.49665e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 3.49665e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 92.5162
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 6.29431e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 6.29431e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 5.21381e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 5.21381e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 5.21381e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 4.16792e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 4.16792e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
```

```
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 3.45244e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 3.45244e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 3.45244e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 90.9747
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 6.65258e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 6.65258e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 5.51059e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 5.51059e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 5.51059e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 4.40516e-15
##
```

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## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 4.40516e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 3.64896e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 3.64896e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 3.64896e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.5202
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 6.44987e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 6.44987e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 5.34267e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 5.34267e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 5.34267e-15
```

```
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 4.27093e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 4.27093e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 3.53777e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 3.53777e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 3.53777e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.9245
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 6.57131e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 6.57131e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 5.44326e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
```

```
## In above message, R1 = 94.1207, R2 = 5.44326e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 5.44326e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 4.35134e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 4.35134e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 3.60438e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 3.60438e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 3.60438e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 94.1207
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 6.3481e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 6.3481e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
```

```
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 5.25837e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 5.25837e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 5.25837e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 4.20354e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 4.20354e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 3.48195e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 3.48195e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 3.48195e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.3262
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 6.563e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
```

```
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 6.563e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 5.43638e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 5.43638e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 5.43638e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 4.34584e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 4.34584e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 3.59982e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 3.59982e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 3.59982e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.6621
##
```

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 6.37284e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 6.37284e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 5.27887e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 5.27887e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 5.27887e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 4.21992e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 4.21992e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 3.49552e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 3.49552e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 3.49552e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
```

```
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.5303
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 6.58055e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 6.58055e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 5.45092e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 5.45092e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 5.45092e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 4.35746e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 4.35746e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 3.60945e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 3.60945e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
```

```
## In above message, R1 = 98.9342, R2 = 3.60945e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.9342
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 6.66369e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 6.66369e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 5.51979e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 5.51979e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 5.51979e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 4.41251e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 4.41251e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 3.65505e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
```

```
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 3.65505e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 3.65505e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 99.087
##
```

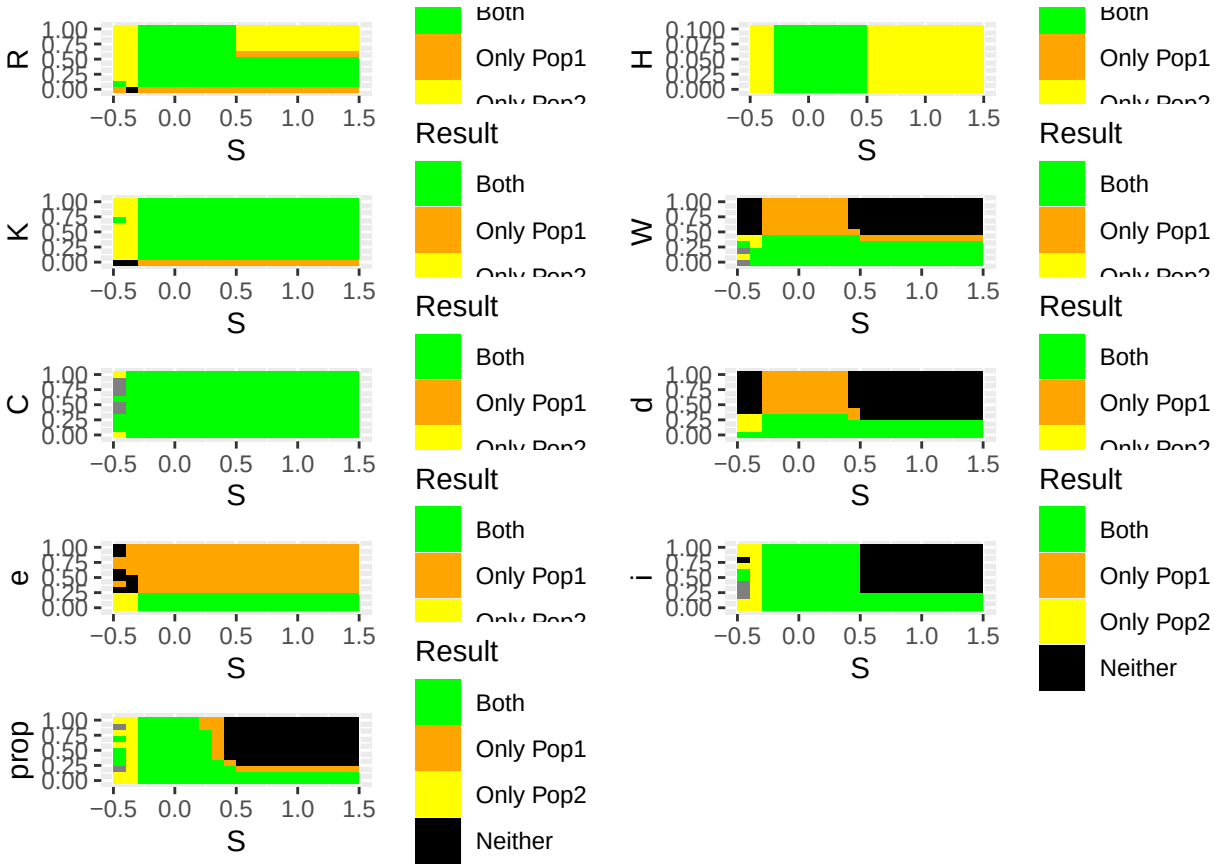

Figure 14: S parameter planes

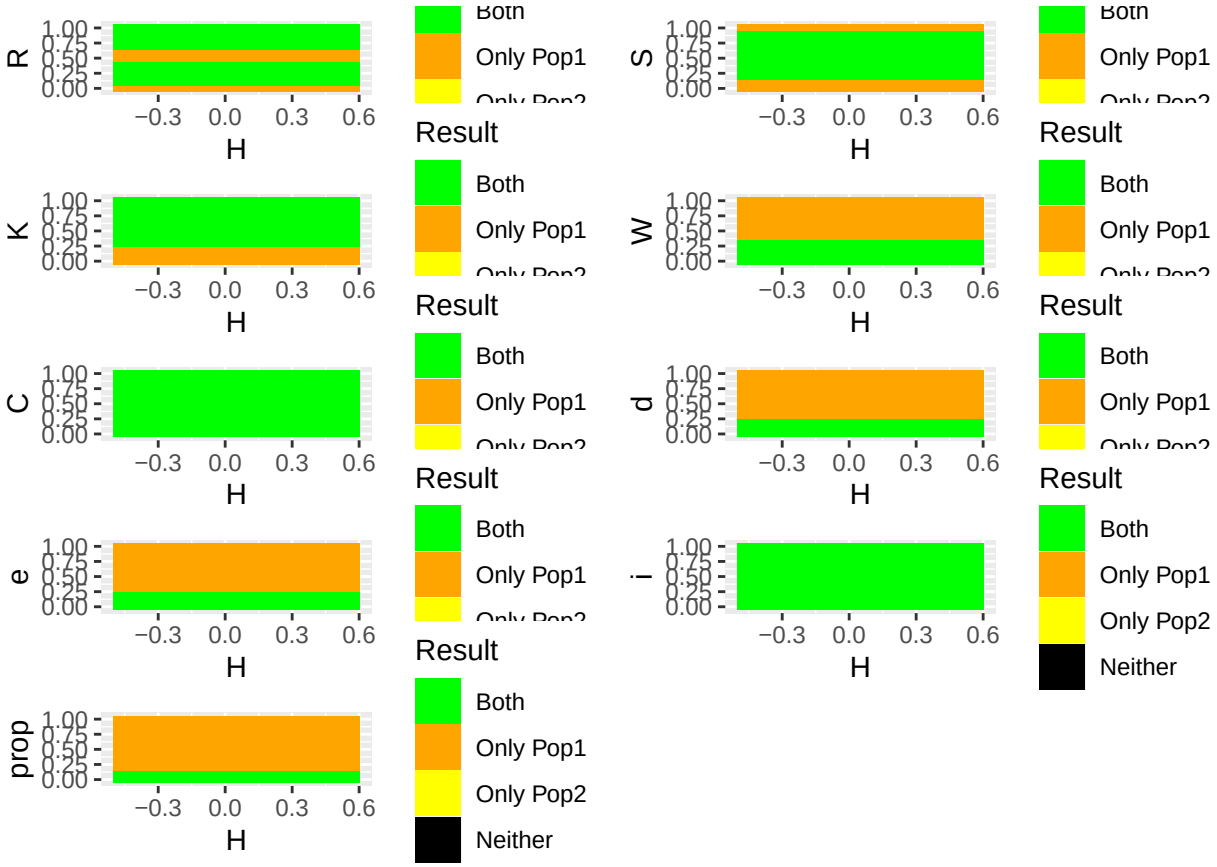

Figure 15: h parameter planes

Figure 16: K parameter planes ranging from 0-1

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 6.56724e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 6.56724e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 5.4399e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 5.4399e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 5.4399e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 4.34865e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 4.34865e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 3.60215e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 3.60215e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.4898, R2 = 3.60215e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
```

```
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.4898
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 6.64338e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 6.64338e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 5.50297e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 5.50297e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 5.50297e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 4.39907e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 4.39907e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 3.64391e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.2153, R2 = 3.64391e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
```

```
## In above message, R1 = 98.2153, R2 = 3.64391e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.2153
##
```

Figure 17: w parameter planes

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 6.3749e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 6.3749e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 5.28057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 5.28057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 5.28057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 4.22128e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 4.22128e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 3.49665e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 3.49665e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 92.5162, R2 = 3.49665e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
```

```
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 92.5162
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 6.29431e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 6.29431e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 5.21381e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 5.21381e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 5.21381e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 4.16792e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 4.16792e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 3.45244e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 90.9747, R2 = 3.45244e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
```

```
## In above message, R1 = 90.9747, R2 = 3.45244e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 90.9747
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 6.65258e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 6.65258e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 5.51058e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 5.51058e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 5.51058e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 4.40515e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 4.40515e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 3.64896e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
```

```
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 3.64896e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.5202, R2 = 3.64896e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.5202
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 6.45019e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 6.45019e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 5.34294e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 5.34294e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 5.34294e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 4.27114e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 4.27114e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
```

```
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 3.53795e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 3.53795e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.9245, R2 = 3.53795e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.9245
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 6.57131e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 6.57131e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 5.44326e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 5.44326e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 5.44326e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 4.35134e-15
##
```

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 4.35134e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 3.60438e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 3.60438e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 94.1207, R2 = 3.60438e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 94.1207
##
```

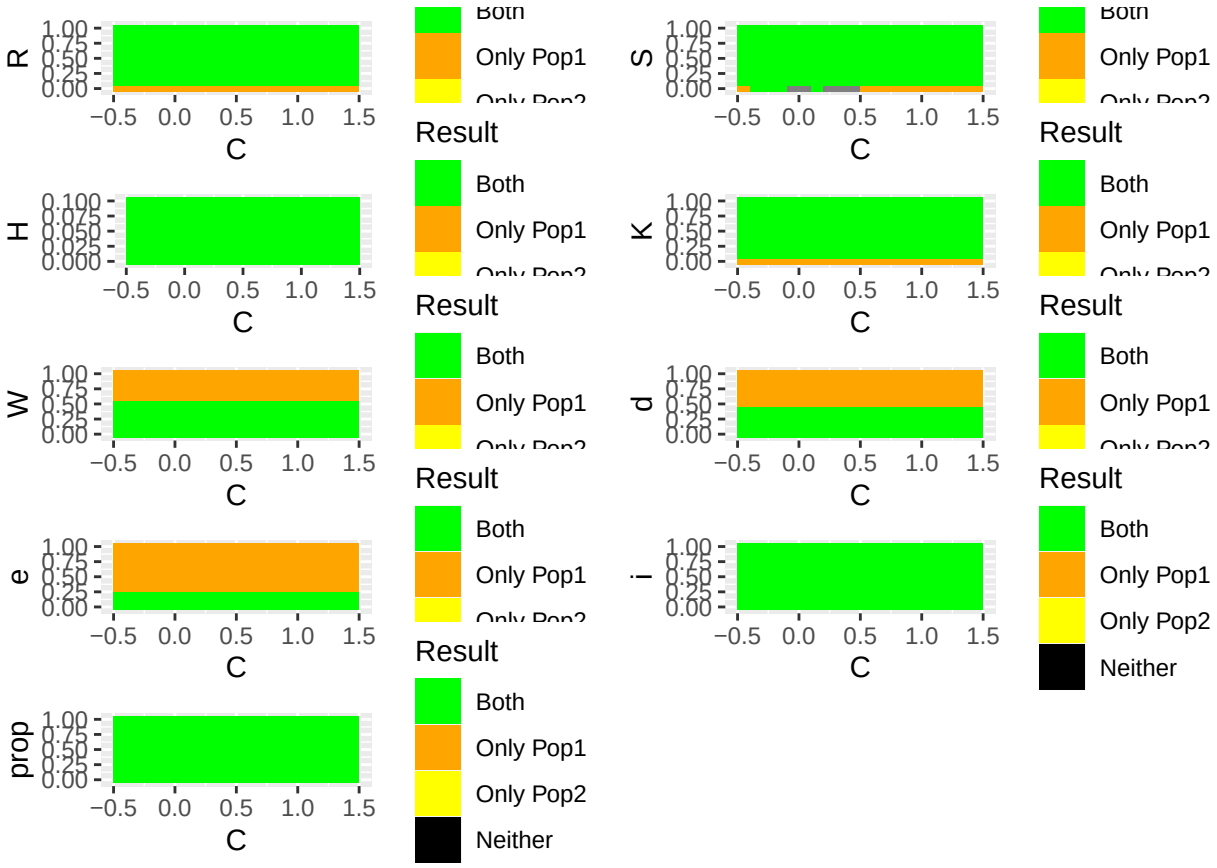

Figure 18: c parameter planes

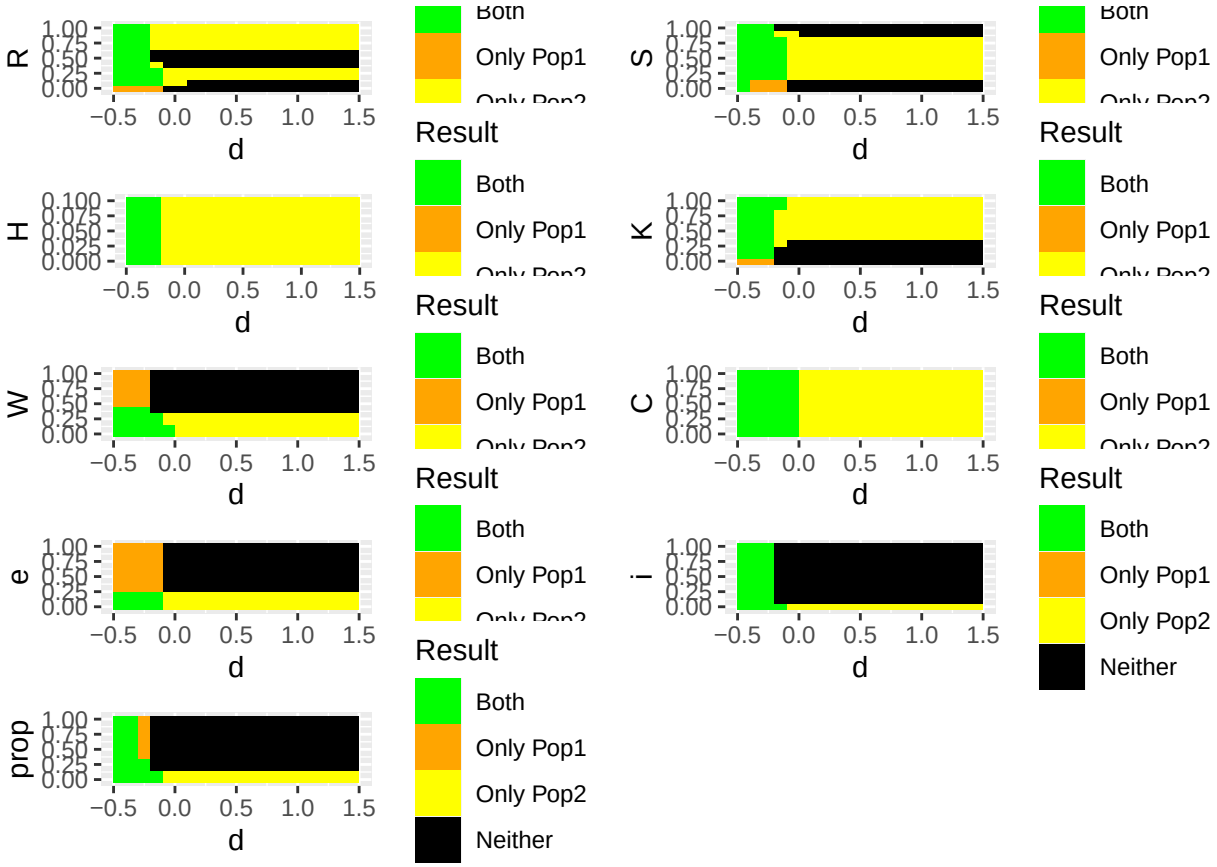

Figure 19: d parameter planes

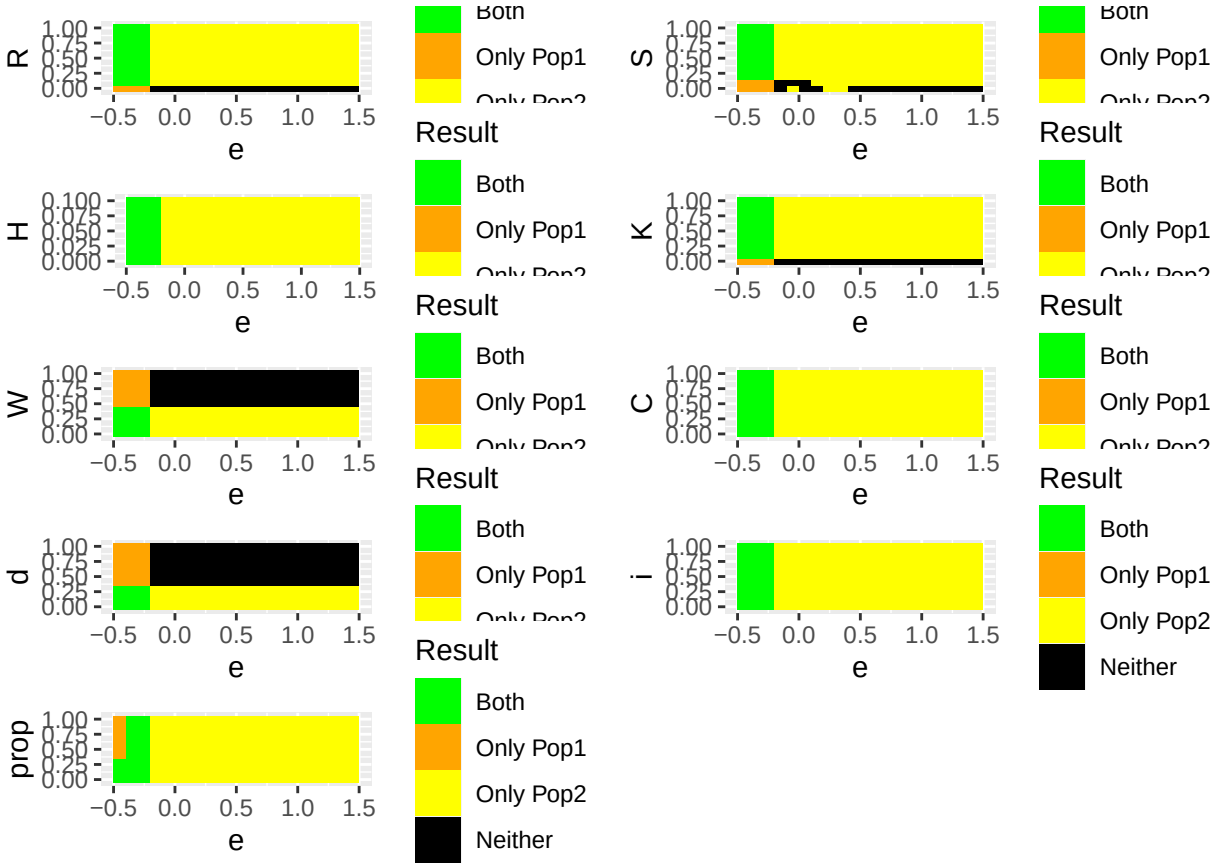

Figure 20: e parameter planes

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 6.3481e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 6.3481e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 5.25837e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 5.25837e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 5.25837e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 4.20354e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 4.20354e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 3.48195e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 3.48195e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.3262, R2 = 3.48195e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
```

```
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.3262
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 6.56298e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 6.56298e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 5.43637e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 5.43637e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 5.43637e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 4.34583e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 4.34583e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 3.59981e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.6621, R2 = 3.59981e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
```

```
## In above message, R1 = 98.6621, R2 = 3.59981e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.6621
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 6.37284e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 6.37284e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 5.27887e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 5.27887e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 5.27887e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 4.21992e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 4.21992e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 3.49552e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
```

```
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 3.49552e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.5303, R2 = 3.49552e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.5303
##
```

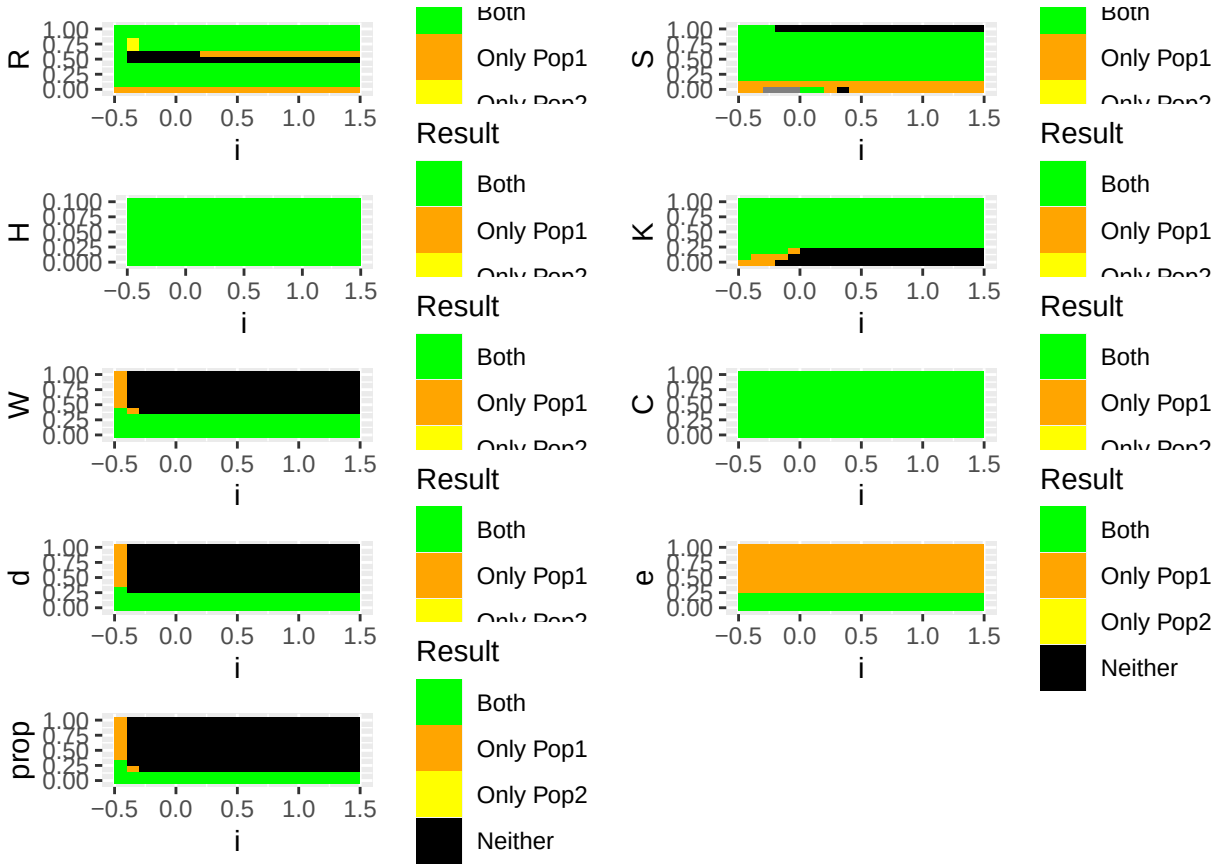

Figure 21: i parameter planes

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 6.58055e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 6.58055e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 5.45092e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 5.45092e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 5.45092e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 4.35746e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 4.35746e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 3.60945e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 3.60945e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 98.9342, R2 = 3.60945e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
```

```
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 98.9342
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 6.66369e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 6.66369e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 5.51979e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 5.51979e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 5.51979e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 4.41251e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 4.41251e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 3.65505e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.087, R2 = 3.65505e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
```

```
## In above message, R1 = 99.087, R2 = 3.65505e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 99.087
##
```

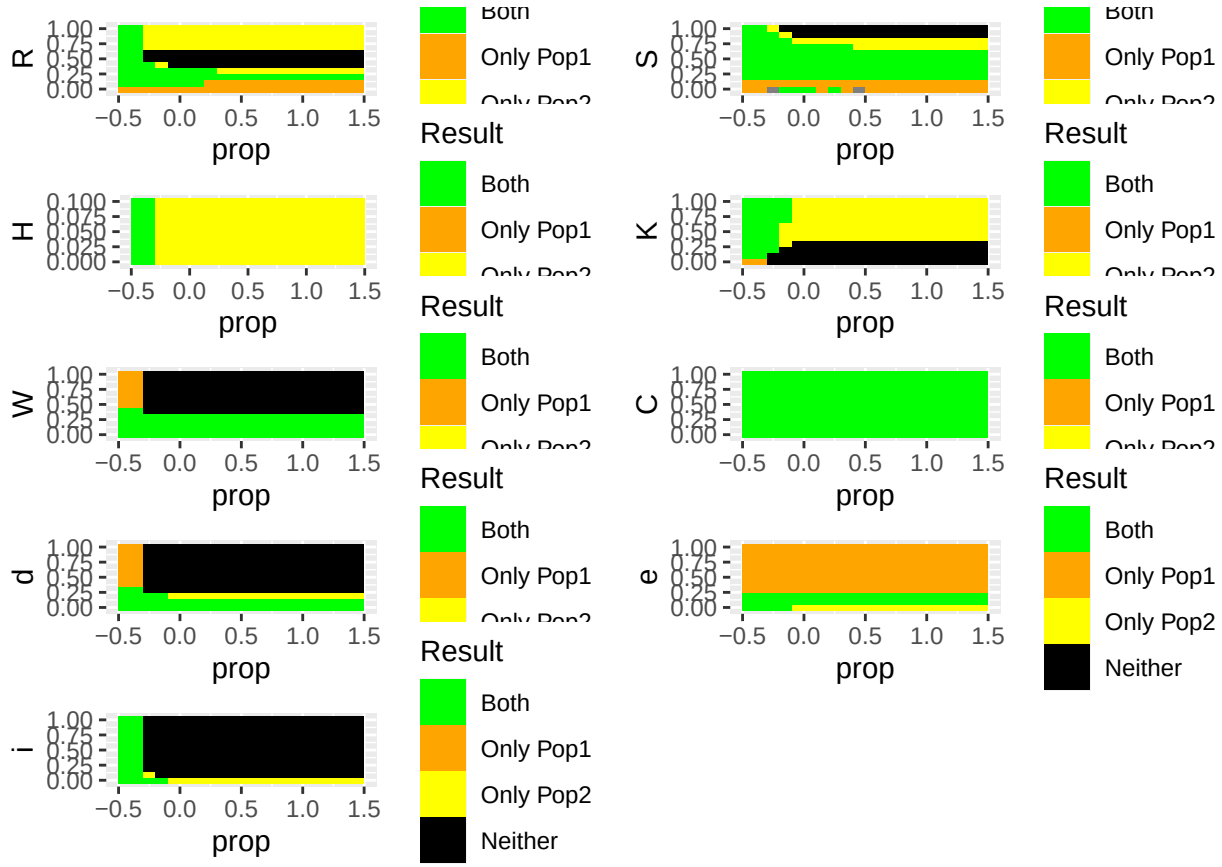

Figure 22: prop parameter planes

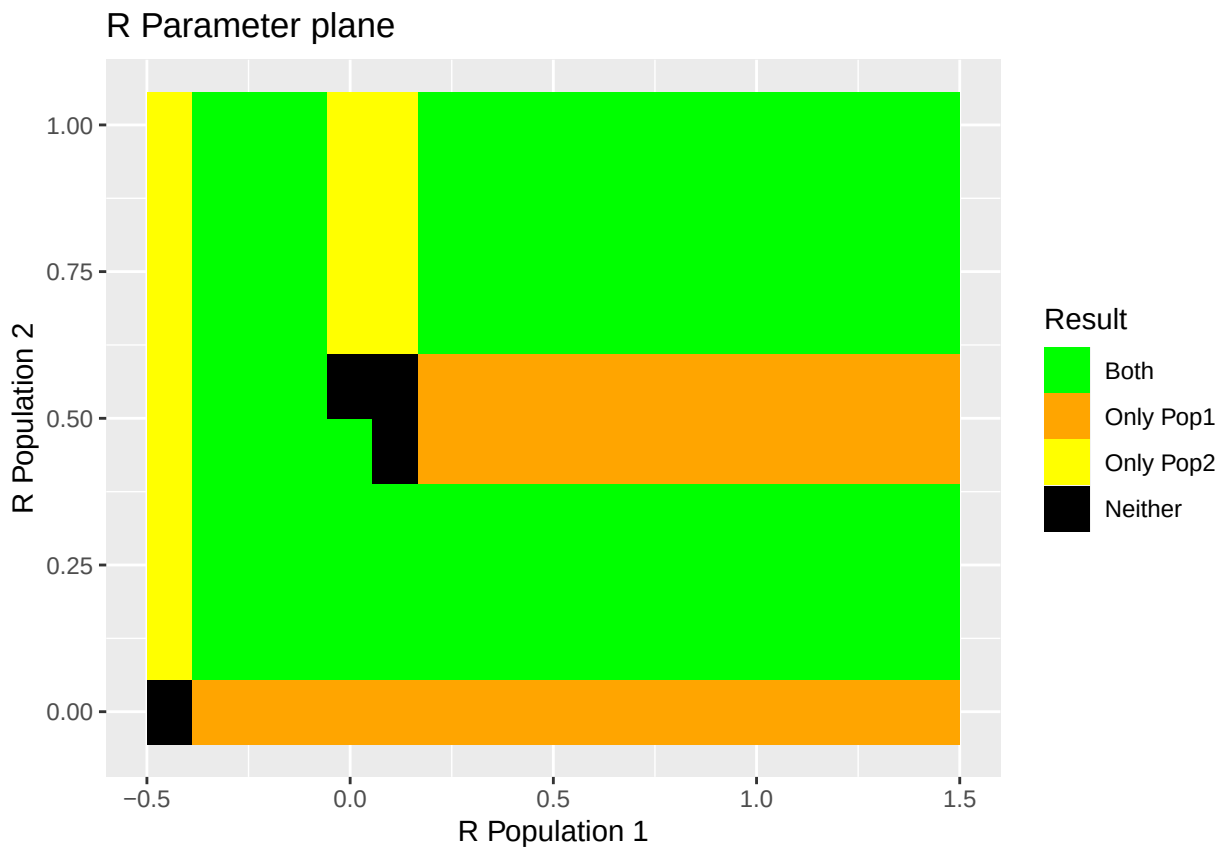

Figure 23: r population planes

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 6.33869e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 6.33869e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 5.25057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 5.25057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
```

```
## In above message, R1 = 99.1823, R2 = 5.25057e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 4.1973e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 4.1973e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 3.47679e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 3.47679e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 3.47679e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 99.1823
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 6.22415e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 6.22415e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 5.1557e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
```

```
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 5.1557e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 5.1557e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 4.12146e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 4.12146e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 3.41396e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 3.41396e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 3.41396e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.6782
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 6.07315e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 6.07315e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
```

```
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 5.03062e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 5.03062e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 5.03062e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 4.02147e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 4.02147e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 3.33114e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 3.33114e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 3.33114e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.0523
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 6.33869e-15
##
```

```
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 6.33869e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 5.25058e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 5.25058e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 5.25058e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 4.19731e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 4.19731e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 3.47679e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 3.47679e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 99.1823, R2 = 3.47679e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 99.1823
```

```
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 6.22415e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 6.22415e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 5.1557e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 5.1557e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 5.1557e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 4.12146e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 4.12146e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 3.41396e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 3.41396e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.6782, R2 = 3.41396e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
```

```
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.6782
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 6.07314e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 6.07314e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 5.03061e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 5.03061e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 5.03061e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 4.02146e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 4.02146e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 3.33113e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 3.33113e-15
##
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
```

```
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 97.0523, R2 = 3.33113e-15
##
## DLSODA-  Above warning has been issued I1 times.
##      It will not be issued again for this problem.
## In above message, I1 = 10
##
## DLSODA-  At current T (=R1), MXSTEP (=I1) steps
##       taken on this call before reaching TOUT
## In above message, I1 = 5000
##
## In above message, R1 = 97.0523
##
```

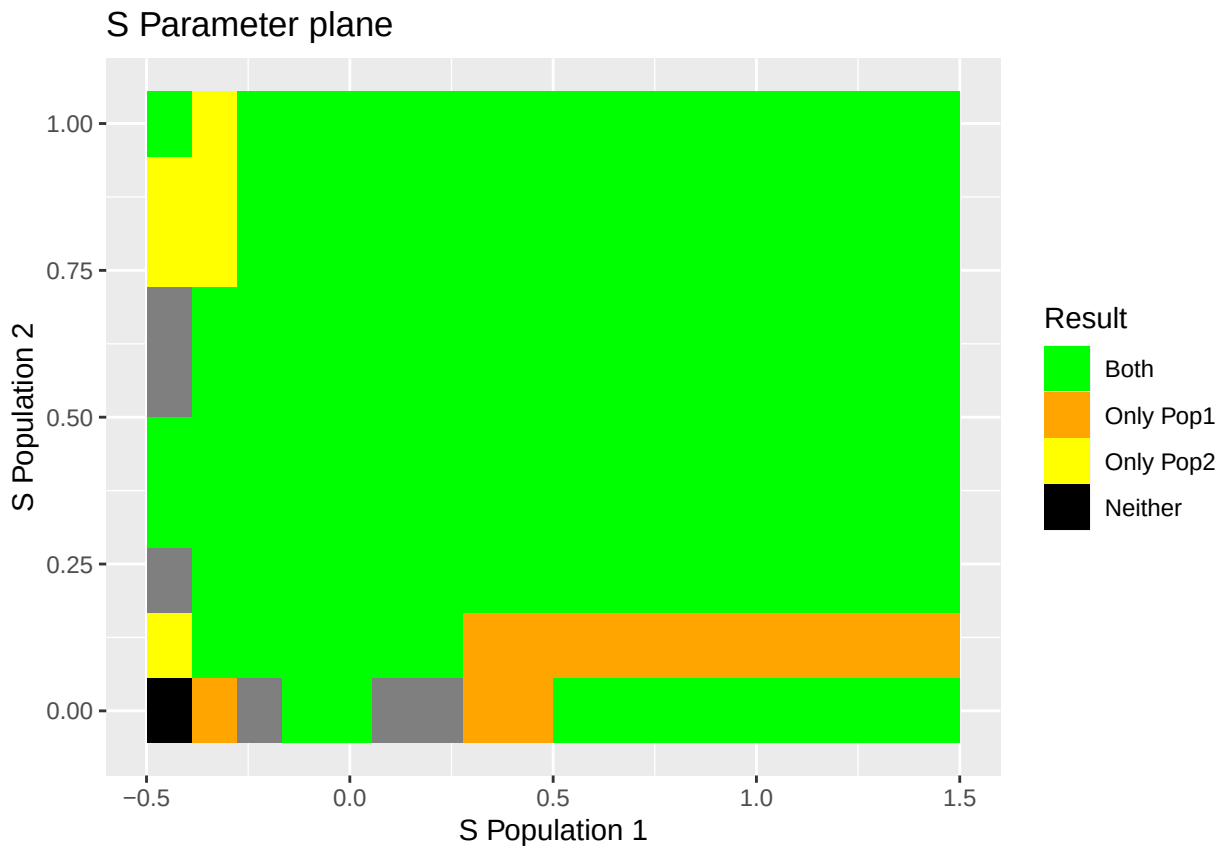

Figure 24: s population planes

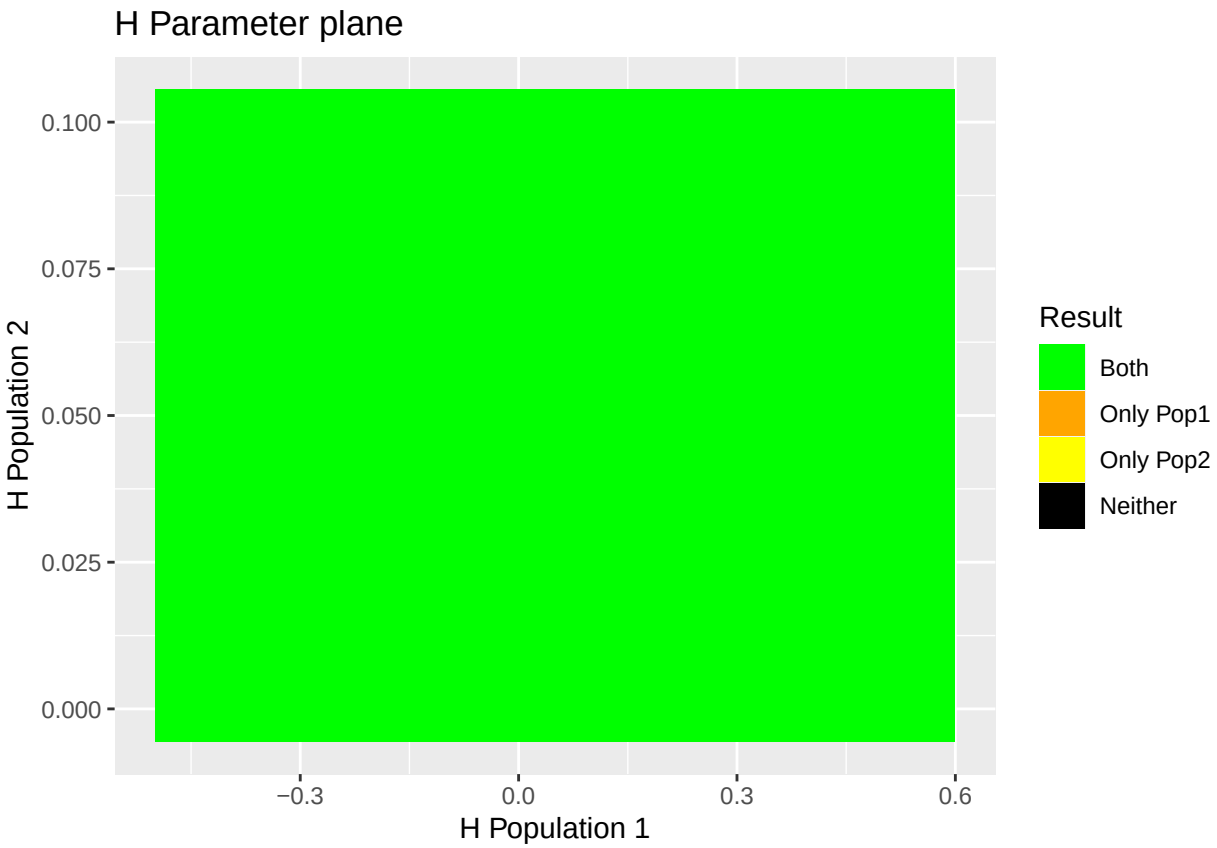

Figure 25: h population planes

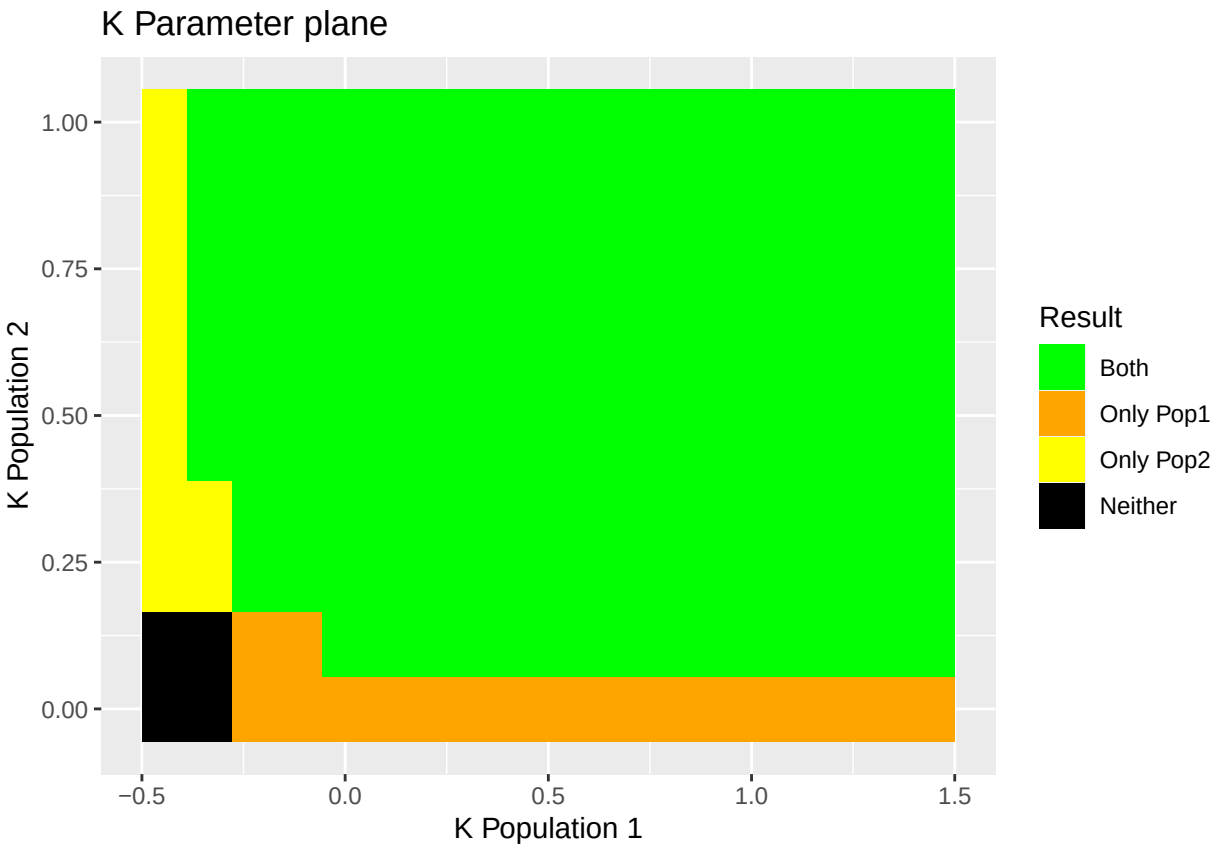

Figure 26: k population planes 0 to 1

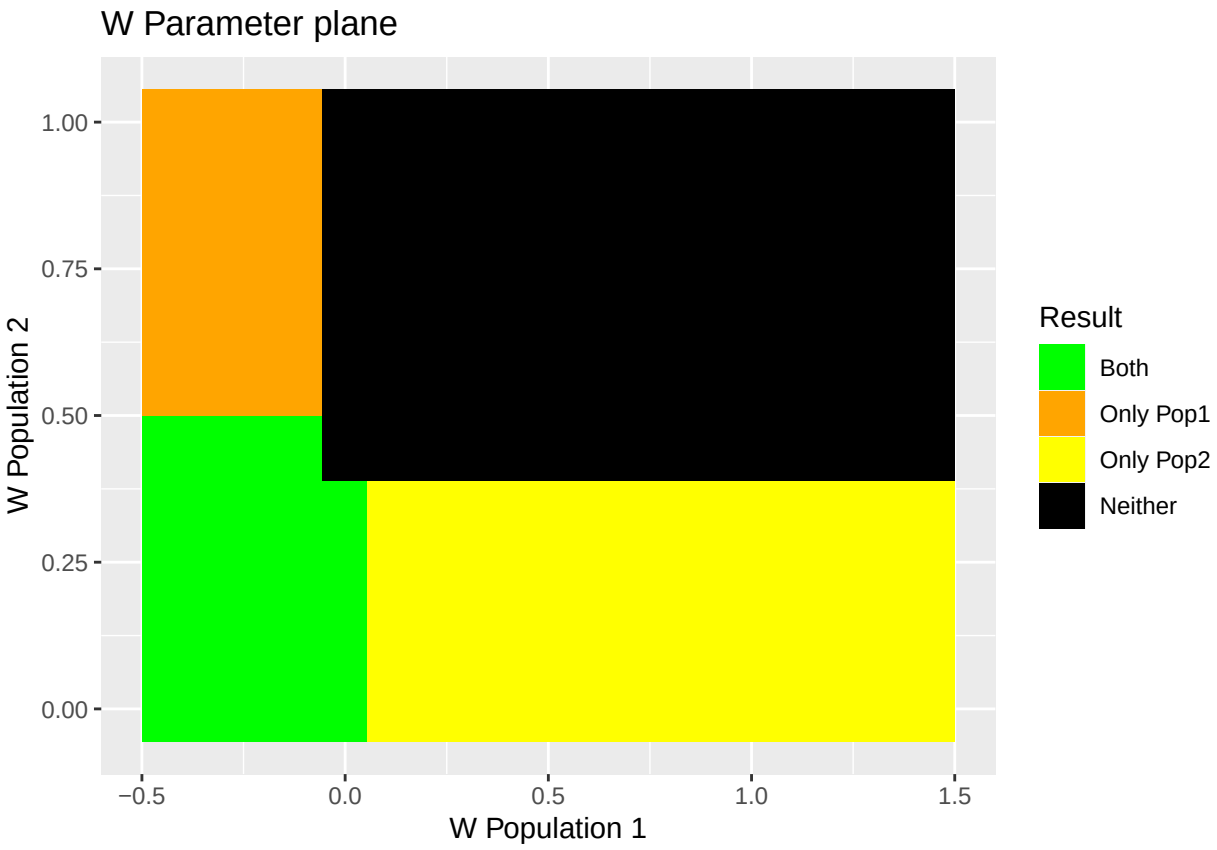

Figure 27: w population planes

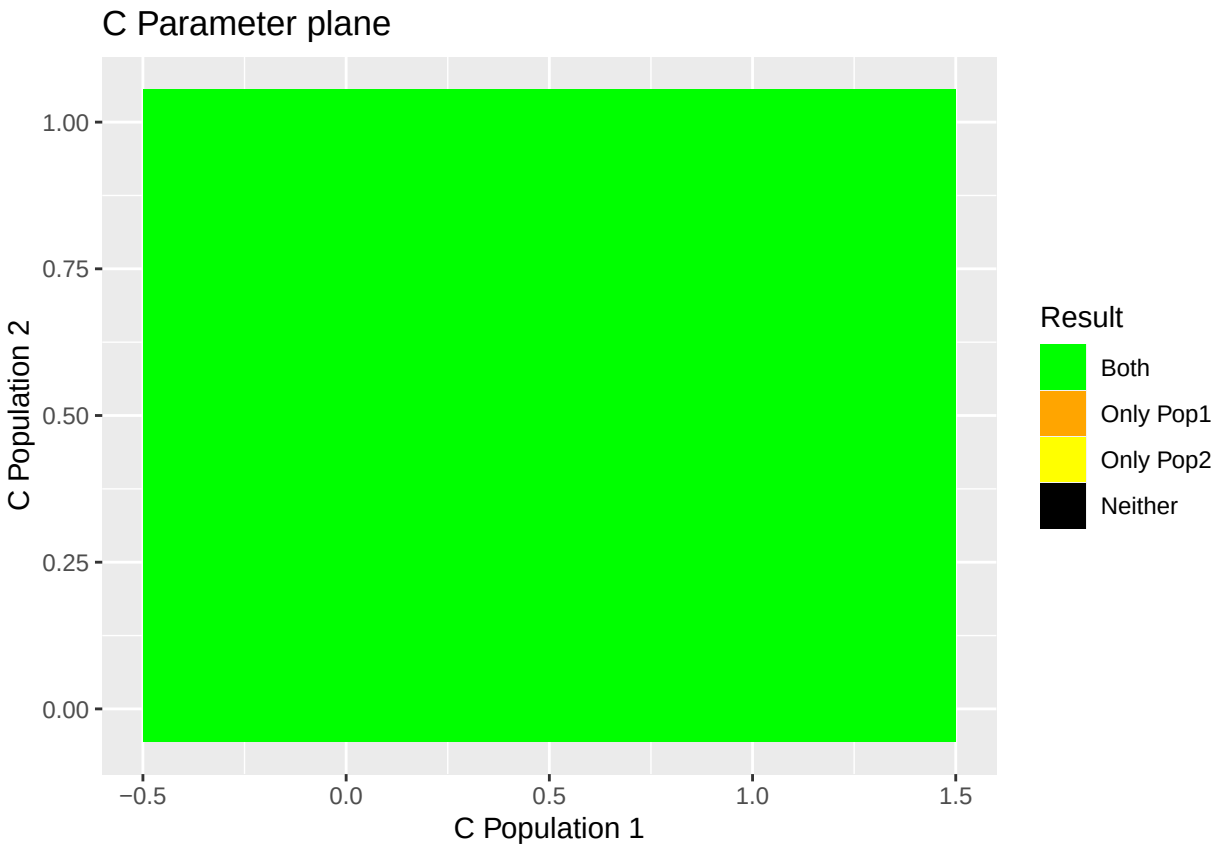

Figure 28: c population planes

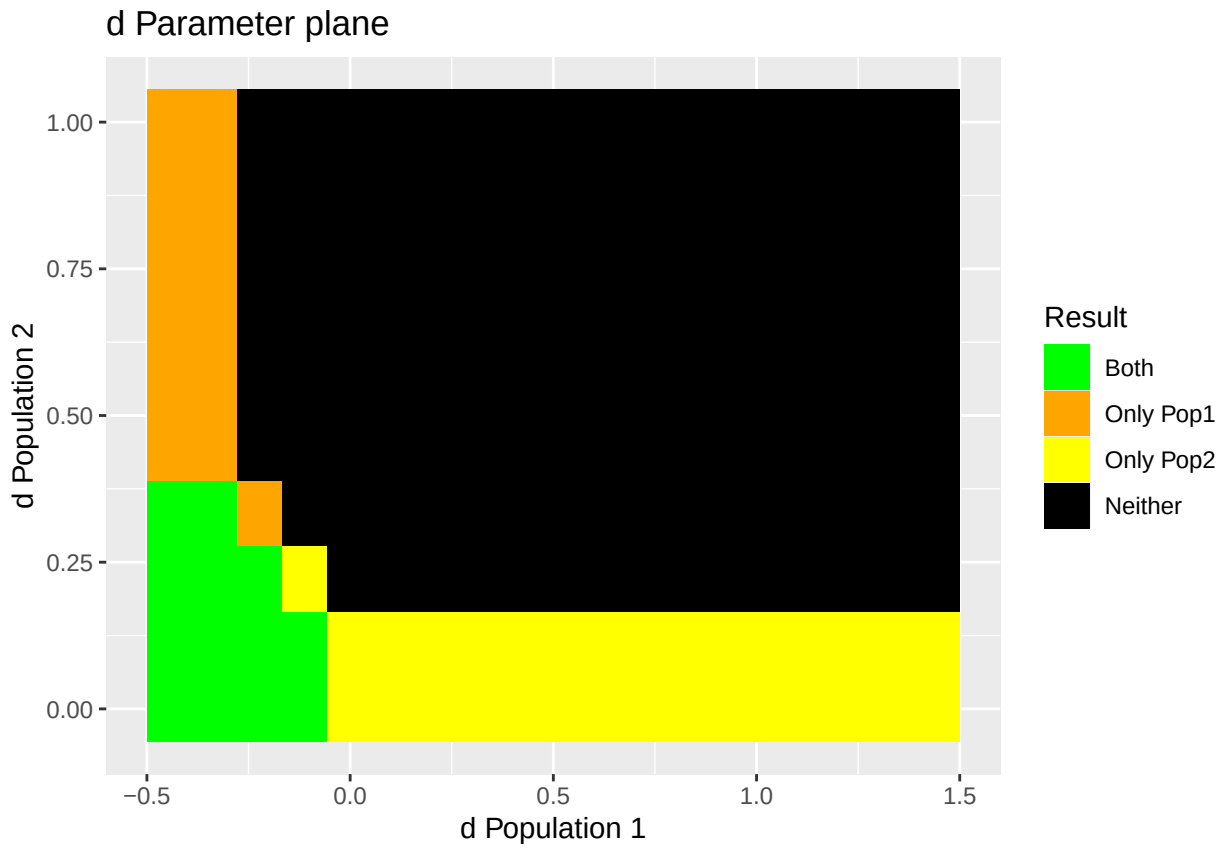

Figure 29: d population planes

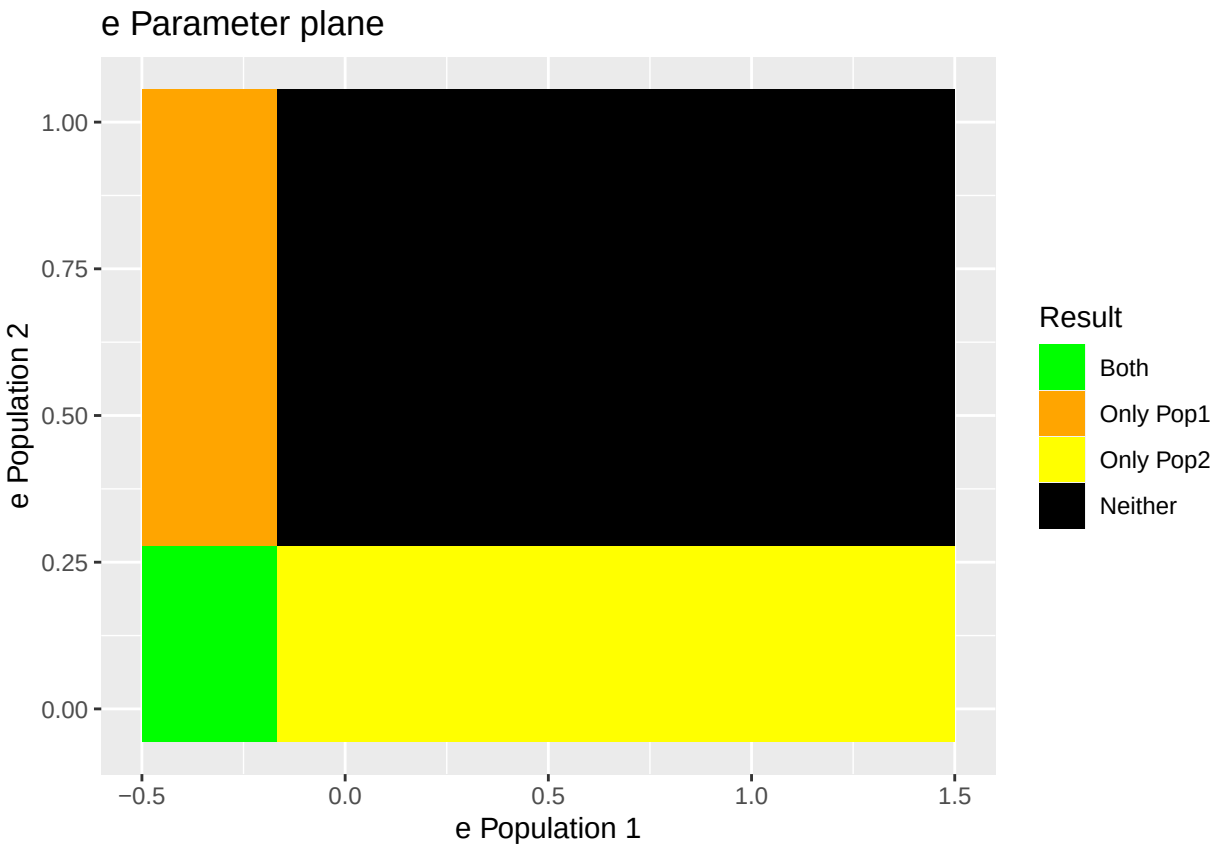

Figure 30: e population planes

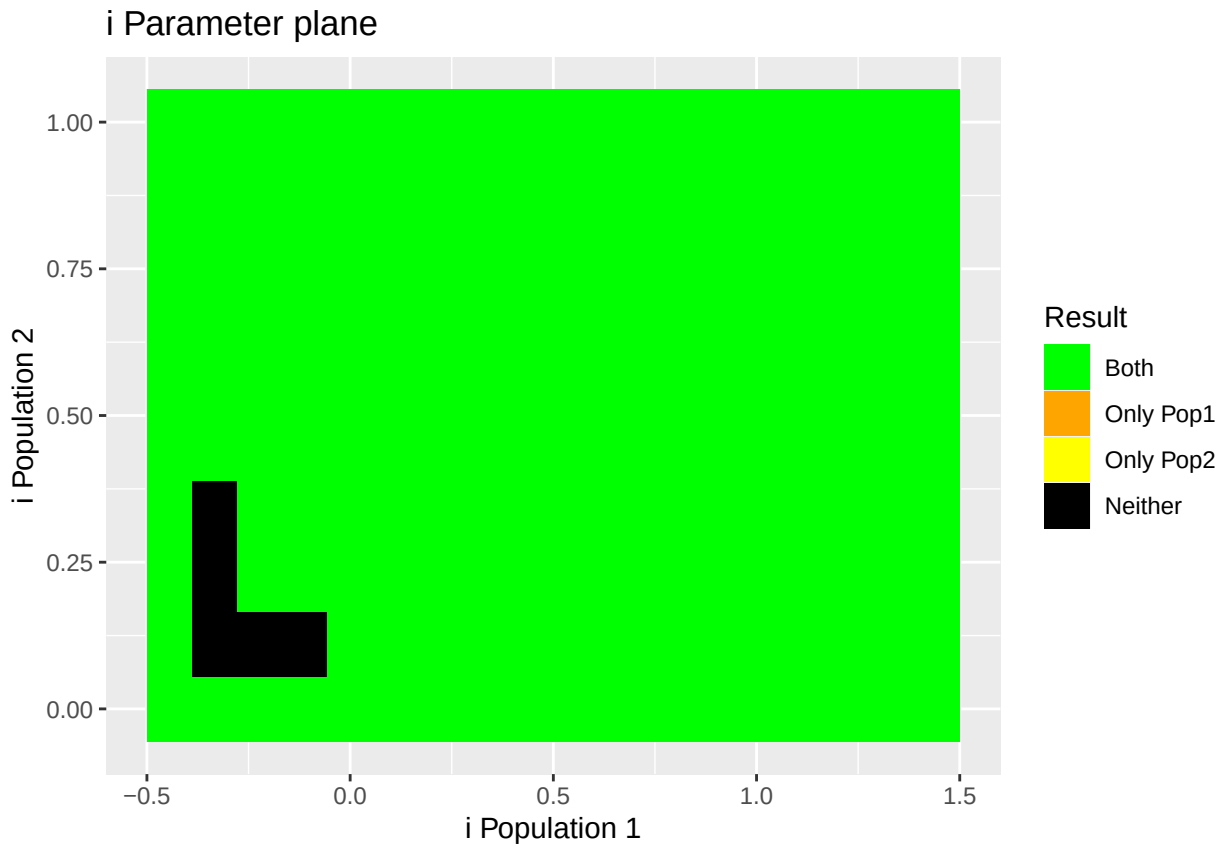

Figure 31: i population planes

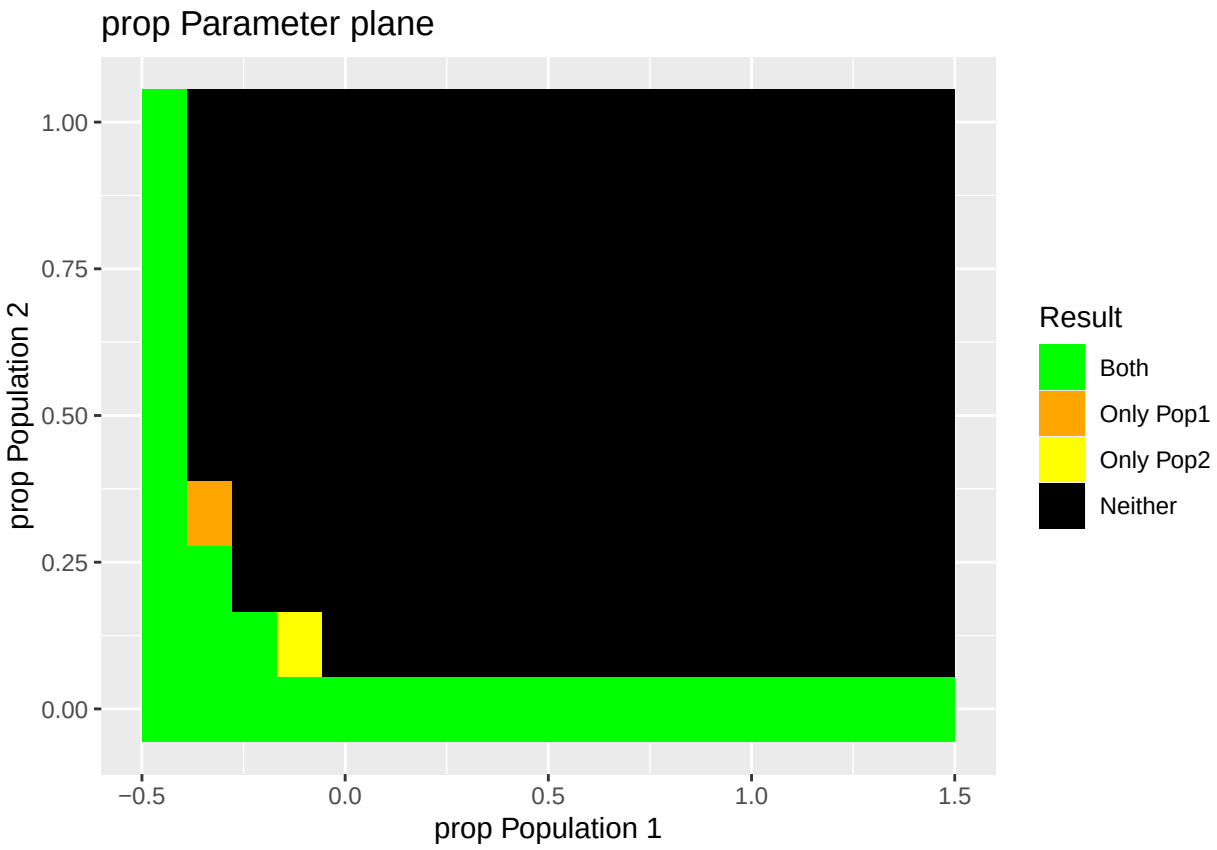

Figure 32: prop population planes