

Formato Archivo Control.ss

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1 Descripción del repositorio

- Directorio con archivos requeridos para ejecutar GADGET
- Directorio con archivos requeridos para ejecutar SS3
- Directorio con ejecutable SS3 para tres sistemas operativos (windows, linux y mac)
- Códigos Rmarkdown (pdf o html) que permita modificar archivos SS3
 - formato data.ss
 - formato contro.ss
 - formato starter.ss
 - formato forecast.ss

2 Descargar archivos requeridos desde repositorio

Tarea pendiente. . . .

3 Librerías requeridas

3.1 Identificamos los directorio de trabajo

```
#dirname.base <- here("10a_anchcadiz")
dirname.base <- here("modelos_SS3", "simple")
```

3.1.0.1 Creamos un nuevo directorio para la nueva versión del modelo modificado

```
dirname.mod <- here("boqueron_SS3")
dir.create(path=dirname.mod, showWarnings = TRUE, recursive = TRUE)
```

3.2 Leer los archivos de Stock Synthesis con la función SS_read()

Cada uno de los archivos de entrada se lee en R como una lista.

Use names() para ver todos los componentes de la lista

```
inputs <- r4ss::SS_read(dir = dirname.base)
names(inputs)
## [1] "dir"      "path"     "dat"      "ctl"      "start"    "fore"     "wtatage"

#trabajaremos con archivo ctl
ctl<-inputs$ctl # archivo base
ctl1<-ctl # archivo modificado
```

3.3 Revisamos los nombres de los componentes de la lista del archivo control que deseamos modificar

```
#matrix(names(ctl1), ncol=1)
```

3.4 Especificaciones iniciales

```
#-----
ctl1$nseas      <- 4
ctl1$N_areas   <- 1
ctl1$Nages     <- 4
ctl1$Nsexes    <- 1
ctl1$Npopbins  <- 44
ctl1$Nfleets   <- 3
ctl1$Do_AgeKey <- 0
ctl1$fleetnames <- c("Fishery","PELAGO","ECOCADIZ")
ctl1$Comments<-"#C 2023 Boqueron Cádiz control file MODELO TRIMESTRAL"
ctl1$eof       <- TRUE
#-----

# revisa salidas
ctl1[1:14]
## $warnings
## [1] ""
##
## $Comments
## [1] "#C 2023 Boqueron Cádiz control file MODELO TRIMESTRAL"
##
## $nseas
## [1] 4
##
## $N_areas
## [1] 1
##
## $Nages
## [1] 4
##
## $Nsexes
## [1] 1
##
## $Npopbins
## [1] 44
##
## $Nfleets
## [1] 3
##
## $Do_AgeKey
## [1] 0
##
## $fleetnames
## [1] "Fishery" "PELAGO" "ECOCADIZ"
##
## $sourcefile
## [1] "C:/SS3_boqueron/SS3_ane27.9a/modelos_SS3/simple/control.ss"
##
## $type
## [1] "Stock_Synthesis_control_file"
##
## $ReadVersion
## [1] "3.30"
```

```
##
## $eof
## [1] TRUE
#-----
```

3.5 Especificaciones del crecimiento

Opciones y especificaciones:

- EmpiricalWAA = 0 means do not read wtatage.ss; 1 means read and use wtatage.ss and also read and use growth parameters
- N_GP = N_Growth_Patterns (Growth Patterns, Morphs, Bio Patterns, GP are terms used interchangeably in SS3)
- N_platoon = N_platoons_Within_GrowthPattern

```
#-----
ctl1$EmpiricalWAA <- 0
ctl1$N_GP          <- 1
ctl1$N_platoon     <- 1
#-----
# revisa salidas
ctl1[15:17]
## $EmpiricalWAA
## [1] 0
##
## $N_GP
## [1] 1
##
## $N_platoon
## [1] 1
#-----
```

3.6 Distribución del reclutamiento

Opciones y especificaciones:

- recr_dist_method = 2=main effects for GP, Area, Settle timing; 3=each Settle entity; 4=none (only when N_GP $N_{settlepop}$ ==1)
- recr_global_area = 1=global; 2=by area
- recr_dist_read = number of recruitment settlement assignments
- recr_dist_inx = unused option

recr_dist_pattern es una Matriz que contiene la siguiente información:

- GPattern:
- month:
- area:
- age:

(for each settlement assignment)

```
#-----
ctl1$recr_dist_method<-3
ctl1$recr_global_area<-1
ctl1$recr_dist_read  <-1
ctl1$recr_dist_inx   <-0
```

```

ctl1[18:21]
## $recr_dist_method
## [1] 3
##
## $recr_global_area
## [1] 1
##
## $recr_dist_read
## [1] 1
##
## $recr_dist_inx
## [1] 0

#-----
      rec_pattern<-data.frame(row.names="recr_dist_pattern1",
                             "GPattern" = 1,
                             "month"    = 1,
                             "area"      = 1,
                             "age"       = 0)
ctl1$recr_dist_pattern<-rec_pattern
#-----
# revisa salidas
ctl1$recr_dist_pattern
##              GPattern month area age
## recr_dist_pattern1      1      1      1      0
#-----

```

3.7 Bloques

Opciones y especificaciones:

- N_Block_Designs =
- blocks_per_pattern =
- Block_Design =

```

#-----
ctl1$N_Block_Designs    <- 1
ctl1$blocks_per_pattern <- 1
ctl1$Block_Design       <- c(1989,1989)
#-----
# revisa salidas
ctl1[23:25]
## $N_Block_Designs
## [1] 1
##
## $blocks_per_pattern
## [1] 1
##
## $Block_Design
## [1] 1989 1989
#-----

```

3.8 Parámetros que varían en el tiempo

Opciones y especificaciones:

- `time_vary_adjust_method` = controls for all timevary parameters. `_time-vary` parm bound check (1=warn relative to base parm bounds; 3=no bound check); Also see `env` (3) and `dev` (5) options to constrain with base bounds.
- `time_vary_auto_generation` = Matriz que contiene la siguiente información: AUTOGEN, autogen: 1st element for biology, 2nd for SR, 3rd for Q, 4th reserved, 5th for selex where: 0 = autogen time-varying parms of this category; 1 = read each time-varying parm line; 2 = read then autogen if parm min=-12345.

```
#-----
ctl1$time_vary_adjust_method <- 1
ctl1$time_vary_adjust_method
## [1] 1
#-----
# arreglo de datos para "time_vary_auto_generation"
time_auto<-data.frame(matrix(rep(1,5),nrow=1,ncol=5))
colnames(time_auto)<-paste("time_vary_auto_generation_",seq(1,5,1),sep="")

ctl1$time_vary_auto_generation<-time_auto
ctl1$time_vary_auto_generation
##   time_vary_auto_generation_1 time_vary_auto_generation_2
## 1                          1                          1
##   time_vary_auto_generation_3 time_vary_auto_generation_4
## 1                          1                          1
##   time_vary_auto_generation_5
## 1                          1
#-----
```

3.9 Parámetros biológicos

Opciones y especificaciones:

- `natM_type`: 0=1Parm;1=N_breakpoints;2=Lorenzen;3=agespecific;4=agespec_withseasinterpolate; 5=BETA;_Maunder_link_to_maturity;6=Lorenzen_rangeno additional input for selected M option; read 1P per morph
- `GrowthModel`: 1= vonBert with L1&L2; 2=Richards with L1&L2; 3=age_specific_K_incr; 4=age_specific_K_decr; 5=age_specific_K_each; 6=NA; 7=NA; 8=growth cessation
- `Growth_Age_for_L1`: Age(post-settlement)_for_L1;linear growth below this
- `Growth_Age_for_L2`: 999 to use as Linf
- `Exp_Decay`: exponential decay for growth above maxage (value should approx initial Z; -999 replicates 3.24; -998 to not allow growth above maxage)
- `Growth_Placeholder`: placeholder for future growth feature
- `N_natMparms`:
- `SD_add_to_LAA`: SD_add_to_LAA (set to 0.1 for SS2 V1.x compatibility)
- `CV_Growth_Pattern`: 0=(CV=f(LAA)); 1=(CV=F(A)); 2=(SD=F(LAA)); 3=(SD=F(A)); 4=(logSD=F(A))
- `maturity_option`: 1=length logistic; 2=age logistic; 3=read age-maturity matrix by growth_pattern; 4=read age-fecundity; 5=disabled; 6=read length-maturity
- `First_Mature_Age`:
- `fecundity_option`: (1)eggs=Wt(a+bWt); (2)eggs=aL^b; (3)eggs=aWt^b; (4)eggs=a+bL; (5)eggs=a+bW
- `hermaphroditism_option`: 0=none; 1=female-to-male age-specific fxn; -1=male-to-female age-specific fxn
- `parameter_offset_approach`: 1- direct, no offset**; 2- male=fem_parmexp(male_parm); 3: male=femaleexp(parm) then old=young*exp(parm)

El siguiente código permite modificar las opciones antes especificadas:

```

#-----
ctl1$natM_type      <- 0
ctl1$GrowthModel    <- 1
ctl1$Growth_Age_for_L1 <- 0.1
ctl1$Growth_Age_for_L2 <- 4
ctl1$Exp_Decay      <- -999
ctl1$Growth_Placeholder <- 0
ctl1$N_natMparms    <- 1
ctl1$SD_add_to_LAA   <- 0
ctl1$CV_Growth_Pattern <- 0
ctl1$maturity_option <- 1
ctl1$First_Mature_Age <- 1
ctl1$fecundity_option <- 1
ctl1$hermaphroditism_option <- 0
ctl1$parameter_offset_approach <- 1
#-----
#revisa salidas
ctl1[28:41]
## $natM_type
## [1] 0
##
## $GrowthModel
## [1] 1
##
## $Growth_Age_for_L1
## [1] 0.1
##
## $Growth_Age_for_L2
## [1] 4
##
## $Exp_Decay
## [1] -999
##
## $Growth_Placeholder
## [1] 0
##
## $N_natMparms
## [1] 1
##
## $SD_add_to_LAA
## [1] 0
##
## $CV_Growth_Pattern
## [1] 0
##
## $maturity_option
## [1] 1
##
## $First_Mature_Age
## [1] 1
##
## $fecundity_option
## [1] 1

```

```
##
## $hermaphroditism_option
## [1] 0
##
## $parameter_offset_approach
## [1] 1
#-----
```

3.9.1 Parámetros biológicos

La función principal del archivo de control es definir los parámetros que utilizará el modelo. A continuación se indican las líneas de parámetros biológicos que serán modificadas:

```
row.names(ctl$MG_parms)
## [1] "NatM_p_1_Fem_GP_1" "L_at_Amin_Fem_GP_1"
## [3] "L_at_Amax_Fem_GP_1" "VonBert_K_Fem_GP_1"
## [5] "CV_young_Fem_GP_1" "CV_old_Fem_GP_1"
## [7] "Wtlen_1_Fem_GP_1" "Wtlen_2_Fem_GP_1"
## [9] "Mat50%_Fem_GP_1" "Mat_slope_Fem_GP_1"
## [11] "Eggs/kg_inter_Fem_GP_1" "Eggs/kg_slope_wt_Fem_GP_1"
## [13] "NatM_p_1_Mal_GP_1" "L_at_Amin_Mal_GP_1"
## [15] "L_at_Amax_Mal_GP_1" "VonBert_K_Mal_GP_1"
## [17] "CV_young_Mal_GP_1" "CV_old_Mal_GP_1"
## [19] "Wtlen_1_Mal_GP_1" "Wtlen_2_Mal_GP_1"
## [21] "RecrDist_GP_1" "RecrDist_Area_1"
## [23] "RecrDist_month_1" "CohortGrowDev"
## [25] "FracFemale_GP_1"
```

La definición de cada línea es la siguiente:

- **NatM_p_1_Fem_GP_1** = Mortalidad natural para el patrón de crecimiento de hembras (Fem) 1, donde el número de parámetros de mortalidad natural depende de la opción seleccionada.
- **L_at_Amin_Fem_GP_1** = Longitud en Amin (unidades en cm) para hembra, patrón de crecimiento 1.
- **L_at_Amax_Fem_GP_1** = Longitud en Amax (unidades en cm) para hembra, patrón de crecimiento 1.
- **VonBert_K_Fem_GP_1** = Coeficiente de crecimiento de von Bertalanffy (las unidades son por año) para las hembras, patrón de crecimiento 1.
- **CV_young_Fem_GP_1** = variabilidad para el tamaño a la edad \leq Amin para las hembras, patrón de crecimiento 1. Tenga en cuenta que CV no puede variar con el tiempo, por lo que no figure env-link o un vector de desviación. Además, las unidades son como CV o como desviación estándar, dependiendo del valor asignado del patrón CV.
- **CV_old_Fem_GP_1** = variabilidad para el tamaño a la edad \geq Amax para las hembras, patrón de crecimiento 1. Para edades intermedias, haga una interpolación lineal de CV en el tamaño medio a la edad. Tenga en cuenta que las unidades para CV dependerán del patrón CV y del valor del parámetro mortalidad-crecimiento como compensación. El valor del CV no puede variar con el tiempo.
- **Wtlen_1_Fem_GP_1** = coeficiente para convertir la longitud en cm en peso en kg para las hembras.
- **Wtlen_2_Fem_GP_1** = exponente en convertir la longitud a peso para hembras.
- **Mat50%_Fem_GP_1** = inflexión logística de madurez (en cm o años) donde la madurez femenina en logitud (o edad) es una función logística.
- **Mat_slope_Fem_GP_1** = pendiente logística (debe tener valor negativo).
- **Eggs_alpha_Fem_GP_1** = parámetros de fecundidad. El uso depende de la opción de fecundidad seleccionada.
- **Eggs_beta_Fem_GP_1**

Cada línea de parámetro biológicos contiene la siguiente información:


```
names(ctl$MG_parms)
## [1] "LO"          "HI"          "INIT"        "PRIOR"       "PR_SD"
## [6] "PR_type"     "PHASE"       "env_var&link" "dev_link"    "dev_minyr"
## [11] "dev_maxyr"   "dev_PH"      "Block"       "Block_Fxn"   "PType"
```

La definición de cada línea es la siguiente:

- LO = un valor mínimo para el parámetro
- HI = un valor máximo para el parámetro
- INIT = valor inicial para el parámetro. Si la fase (descrita a continuación) para el parámetro es negativa, el parámetro se fija en este valor. Si se lee el archivo ss.par, sobrescribe estos valores INIT.
- PRIOR = valor esperado para el parámetro. Este valor se ignora si el PR_type es 0 (no prior) o 1 (symmetric beta). Si PR_type es lognormal (descrito a continuación).
- PR_SD = desviación standar de la PRIOR, utilizado para calcular la likelihood del valor del parámetro actual. Este valor es ignorado si la PR_type es 0.
- PR_type = tipo de distribución de error del valor esperado:
 - 0 = ninguno
 - 1 = symmetric beta
 - 2 = full beta
 - 3 = lognormal sin ajuste de sesgo
 - 4 = lognormal con ajuste de sesgo
 - 5 = gamma, y
 - 6 = normal.
- PHASE = fase en la que se empieza a estimar el parámetro. Un valor negativo hace que el parámetro conserve su valor INIT (o valor leído del archivo ss.par)
- env_var&link = crea un vínculo a una serie temporal ingresada al archivo de datos
- dev_link = invoca el uso del vector de desviación en la función linkage
- dev_minyr= año de inicio del vector de desviación
- dev_maxyr= año final para el vector de desviación
- dev_PH = fase de estimación para elementos en el vector de desviación
- Block = bloque de tiempo o tendencia a aplicar
- Block_Fxn= forma funcional para el desplazamiento de bloques

3.9.1.0.1 Mortalidad natural Fem GP_1

```
##-----
MG_parms1<-data.frame(row.names="NatM_p_1_Fem_GP_1",
                      "LO"          = 0.05,
                      "HI"          = 1.6,
                      "INIT"        = 0.7,
                      "PRIOR"       = -1.60944,
                      "PR_SD"      = 0.1,
                      "PR_type"     = 0,
                      "PHASE"       = -4,
                      "env_var&link" = 0,
                      "dev_link"    = 0,
                      "dev_minyr"   = 0,
```

```

        "dev_maxyr"    = 0,
        "dev_PH"       = 0,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$MG_parms[1,] <- MG_parms1
##-----
MG_parms2<-data.frame(row.names="L_at_Amin_Fem_GP_1",
        "LO"          = 0,
        "HI"          = 10,
        "INIT"         = 6,
        "PRIOR"        = 32,
        "PR_SD"        = 99,
        "PR_type"      = 0,
        "PHASE"        = 5,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$MG_parms[2,]<-MG_parms2
##-----
MG_parms3<-data.frame(row.names="L_at_Amax_Fem_GP_1",
        "LO"          = 5,
        "HI"          = 22,
        "INIT"         = 18,
        "PRIOR"        = 50,
        "PR_SD"        = 99,
        "PR_type"      = 0,
        "PHASE"        = 5,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$MG_parms[3,]<-MG_parms3
##-----
MG_parms4<-data.frame(row.names="VonBert_K_Fem_GP_1",
        "LO"          = 0.1,
        "HI"          = 2.0,
        "INIT"         = 0.5,
        "PRIOR"        = 0.3,
        "PR_SD"        = 99,
        "PR_type"      = 0,
        "PHASE"        = 3,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0,

```

```

        "Block"          = 0,
        "Block_Fxn"      = 0)
ctl1$MG_parms[4,]<-MG_parms4
##-----
MG_parms5<-data.frame(row.names="CV_young_Fem_GP_1",
        "LO"            = 0.03,
        "HI"            = 0.150,
        "INIT"          = 0.066,
        "PRIOR"         = 0.1,
        "PR_SD"         = 99,
        "PR_type"       = 0,
        "PHASE"         = 5,
        "env_var&link"  = 0,
        "dev_link"      = 0,
        "dev_minyr"     = 0,
        "dev_maxyr"     = 0,
        "dev_PH"        = 0,
        "Block"         = 0,
        "Block_Fxn"     = 0)
ctl1$MG_parms[5,]<-MG_parms5
##-----
MG_parms6<-data.frame(row.names="CV_old_Fem_GP_1",
        "LO"            = 0.03,
        "HI"            = 0.150,
        "INIT"          = 0.066,
        "PRIOR"         = 0.1,
        "PR_SD"         = 99,
        "PR_type"       = 0,
        "PHASE"         = 5,
        "env_var&link"  = 0,
        "dev_link"      = 0,
        "dev_minyr"     = 0,
        "dev_maxyr"     = 0,
        "dev_PH"        = 0,
        "Block"         = 0,
        "Block_Fxn"     = 0)
ctl1$MG_parms[6,]<-MG_parms6
##-----
MG_parms7<-data.frame(row.names="Wtlen_1_Fem_GP_1",
        "LO"            = -3.0,
        "HI"            = 3.0,
        "INIT"          = 0.00563,
        "PRIOR"         = 0.00563,
        "PR_SD"         = 99,
        "PR_type"       = 0,
        "PHASE"         = -50,
        "env_var&link"  = 0,
        "dev_link"      = 0,
        "dev_minyr"     = 0,
        "dev_maxyr"     = 0,
        "dev_PH"        = 0,
        "Block"         = 0,
        "Block_Fxn"     = 0)

```

```

ctl1$MG_parms[7,]<-MG_parms7
##-----
MG_parms8<-data.frame(row.names="Wtlen_2_Fem_GP_1",
                      "LO"          = -3.0,
                      "HI"          = 3.0,
                      "INIT"         = 3.1591,
                      "PRIOR"        = 3.1591,
                      "PR_SD"        = 99,
                      "PR_type"      = 0,
                      "PHASE"        = -50,
                      "env_var&link" = 0,
                      "dev_link"     = 0,
                      "dev_minyr"    = 0,
                      "dev_maxyr"    = 0,
                      "dev_PH"       = 0,
                      "Block"        = 0,
                      "Block_Fxn"    = 0)
ctl1$MG_parms[8,]<-MG_parms8
##-----
MG_parms9<-data.frame(row.names="Wtlen_2_Fem_GP_1",
                      "LO"          = -3.0,
                      "HI"          = 3.0,
                      "INIT"         = 3.1591,
                      "PRIOR"        = 3.1591,
                      "PR_SD"        = 99,
                      "PR_type"      = 0,
                      "PHASE"        = -50,
                      "env_var&link" = 0,
                      "dev_link"     = 0,
                      "dev_minyr"    = 0,
                      "dev_maxyr"    = 0,
                      "dev_PH"       = 0,
                      "Block"        = 0,
                      "Block_Fxn"    = 0)
ctl1$MG_parms[9,]<-MG_parms9
##-----
MG_parms10<-data.frame(row.names="Mat_slope_Fem_GP_1",
                      "LO"          = -3.0,
                      "HI"          = 3.0,
                      "INIT"         = -0.45,
                      "PRIOR"        = -0.45,
                      "PR_SD"        = 99,
                      "PR_type"      = 0,
                      "PHASE"        = -50,
                      "env_var&link" = 0,
                      "dev_link"     = 0,
                      "dev_minyr"    = 0,
                      "dev_maxyr"    = 0,
                      "dev_PH"       = 0,
                      "Block"        = 0,
                      "Block_Fxn"    = 0)
ctl1$MG_parms[10,]<-MG_parms10
##-----

```

```

MG_parms11<-data.frame(row.names="Eggs/kg_inter_Fem_GP_1",
                        "LO"          = -3.0,
                        "HI"          = 3.0,
                        "INIT"         = 1,
                        "PRIOR"        = 1,
                        "PR_SD"        = 99,
                        "PR_type"      = 0,
                        "PHASE"        = -50,
                        "env_var&link" = 0,
                        "dev_link"     = 0,
                        "dev_minyr"    = 0,
                        "dev_maxyr"    = 0,
                        "dev_PH"       = 0,
                        "Block"        = 0,
                        "Block_Fxn"    = 0)
ctl1$MG_parms[11,]<-MG_parms11
##-----
MG_parms12<-data.frame(row.names="Eggs/kg_slope_wt_Fem_GP_1",
                        "LO"          = -3.0,
                        "HI"          = 3.0,
                        "INIT"         = 1,
                        "PRIOR"        = 1,
                        "PR_SD"        = 99,
                        "PR_type"      = 0,
                        "PHASE"        = -50,
                        "env_var&link" = 0,
                        "dev_link"     = 0,
                        "dev_minyr"    = 0,
                        "dev_maxyr"    = 0,
                        "dev_PH"       = 0,
                        "Block"        = 0,
                        "Block_Fxn"    = 0)
ctl1$MG_parms[12,]<-MG_parms12
##-----
MG_parms13<-data.frame(row.names="RecrDist_GP_1_area_1_month_1",
                        "LO"          = 0,
                        "HI"          = 10,
                        "INIT"         = 1,
                        "PRIOR"        = 1,
                        "PR_SD"        = 99,
                        "PR_type"      = 0,
                        "PHASE"        = -3,
                        "env_var&link" = 0,
                        "dev_link"     = 0,
                        "dev_minyr"    = 0,
                        "dev_maxyr"    = 0,
                        "dev_PH"       = 0,
                        "Block"        = 0,
                        "Block_Fxn"    = 0)
ctl1$MG_parms[13,]<-MG_parms13
##-----
MG_parms14<-data.frame(row.names="CohortGrowDev",
                        "LO"          = 1,

```

```

        "HI"          = 1,
        "INIT"        = 1,
        "PRIOR"        = 1,
        "PR_SD"        = 99,
        "PR_type"      = 0,
        "PHASE"        = -1,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$MG_parms[14,]<-MG_parms14
##-----
MG_parms15<-data.frame(row.names="FracFemale_GP_1",
        "LO"          = 0.000001,
        "HI"          = 0.999999,
        "INIT"        = 0.5,
        "PRIOR"        = 0.5,
        "PR_SD"        = 0.5,
        "PR_type"      = 0,
        "PHASE"        = -99,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$MG_parms[15,]<-MG_parms15
##-----
# revisa salidas primeras columnas
ctl1$MG_parms[,1:6]
##          LO          HI          INIT          PRIOR PR_SD
## NatM_p_1_Fem_GP_1    5e-02  1.6000000  0.70000000 -1.60944000  0.1
## L_at_Amin_Fem_GP_1    0e+00 10.0000000  6.00000000 32.00000000 99.0
## L_at_Amax_Fem_GP_1    5e+00 22.0000000 18.00000000 50.00000000 99.0
## VonBert_K_Fem_GP_1    1e-01  2.0000000  0.50000000  0.30000000 99.0
## CV_young_Fem_GP_1     3e-02  0.1500000  0.06600000  0.10000000 99.0
## CV_old_Fem_GP_1       3e-02  0.1500000  0.06600000  0.10000000 99.0
## Wtlen_1_Fem_GP_1      -3e+00  3.0000000  0.00563000  0.00563000 99.0
## Wtlen_2_Fem_GP_1      -3e+00  3.0000000  3.15910000  3.15910000 99.0
## Mat50%_Fem_GP_1       -3e+00  3.0000000  3.15910000  3.15910000 99.0
## Mat_slope_Fem_GP_1    -3e+00  3.0000000 -0.45000000 -0.45000000 99.0
## Eggs/kg_inter_Fem_GP_1 -3e+00  3.0000000  1.00000000  1.00000000 99.0
## Eggs/kg_slope_wt_Fem_GP_1 -3e+00  3.0000000  1.00000000  1.00000000 99.0
## NatM_p_1_Mal_GP_1     0e+00 10.0000000  1.00000000  1.00000000 99.0
## L_at_Amin_Mal_GP_1     1e+00  1.0000000  1.00000000  1.00000000 99.0
## L_at_Amax_Mal_GP_1     1e-06  0.9999999  0.50000000  0.50000000  0.5
## VonBert_K_Mal_GP_1     5e-02  0.2500000  0.16353300  0.15000000  0.8
## CV_young_Mal_GP_1      5e-02  0.2500000  0.10000000  0.10000000  0.8
## CV_old_Mal_GP_1       5e-02  0.2500000  0.10000000  0.10000000  0.8

```

```
## Wtlen_1_Mal_GP_1      -3e+00  3.000000  0.00000244  0.00000244  0.8
## Wtlen_2_Mal_GP_1      -3e+00  4.000000  3.34694000  3.34694000  0.8
## RecrDist_GP_1         0e+00  0.000000  0.00000000  0.00000000  0.0
## RecrDist_Area_1       0e+00  0.000000  0.00000000  0.00000000  0.0
## RecrDist_month_1      0e+00  0.000000  0.00000000  0.00000000  0.0
## CohortGrowDev         1e-01 10.000000  1.00000000  1.00000000  1.0
## FracFemale_GP_1       1e-06  0.999999  0.50000000  0.50000000  0.5
##                      PR_type
## NatM_p_1_Fem_GP_1      0
## L_at_Amin_Fem_GP_1     0
## L_at_Amax_Fem_GP_1     0
## VonBert_K_Fem_GP_1     0
## CV_young_Fem_GP_1      0
## CV_old_Fem_GP_1        0
## Wtlen_1_Fem_GP_1       0
## Wtlen_2_Fem_GP_1       0
## Mat50%_Fem_GP_1        0
## Mat_slope_Fem_GP_1     0
## Eggs/kg_inter_Fem_GP_1 0
## Eggs/kg_slope_wt_Fem_GP_1 0
## NatM_p_1_Mal_GP_1      0
## L_at_Amin_Mal_GP_1     0
## L_at_Amax_Mal_GP_1     0
## VonBert_K_Mal_GP_1     6
## CV_young_Mal_GP_1      0
## CV_old_Mal_GP_1        0
## Wtlen_1_Mal_GP_1       0
## Wtlen_2_Mal_GP_1       0
## RecrDist_GP_1          0
## RecrDist_Area_1        0
## RecrDist_month_1       0
## CohortGrowDev          0
## FracFemale_GP_1        0
##-----
```

3.9.1.0.2 seasonal_effects_on_biology_parms

MGparm_seas_effects:

```
##-----
MGparm_seas_effects1<-data.frame(matrix(rep(0,10),nrow=1,ncol=10))
colnames(MGparm_seas_effects1)<-paste("MGparm_seas_effects_",seq(1,10,1),sep="")

ctl1$MGparm_seas_effects<-MGparm_seas_effects1
##-----
# para revisar
ctl1$MGparm_seas_effects
##   MGparm_seas_effects_1 MGparm_seas_effects_2 MGparm_seas_effects_3
## 1                      0                      0                      0
##   MGparm_seas_effects_4 MGparm_seas_effects_5 MGparm_seas_effects_6
## 1                      0                      0                      0
##   MGparm_seas_effects_7 MGparm_seas_effects_8 MGparm_seas_effects_9
## 1                      0                      0                      0
##   MGparm_seas_effects_10
```

```
## 1                                0
##-----
```

3.10 Relación stock recluta

- SR_function: 1=NA;2=Ricker;3=std_B-H;4=SCAA;5=Hockey; 6=B-H_flattop; 7=survival_3Parm; 8=Shepherd_3Parm; 9=RickerPower_3parm
- Use_steep_init_equi: 0/1 to use steepness in initial equ recruitment calculation
- Sigma_R_FofCurvature: future feature: 0/1 to make realized sigmaR a function of SR curvature

```
# Especificaciones iniciales
##-----
ctl1$SR_function      <- 4
ctl1$Use_steep_init_equi <- 0
ctl1$Sigma_R_FofCurvature <- 0
##-----

# revisar salidas
ctl1[44:46]
## $SR_function
## [1] 4
##
## $Use_steep_init_equi
## [1] 0
##
## $Sigma_R_FofCurvature
## [1] 0

# Sección donde se ingresan los parámetros
##-----
SR_parms1<-data.frame(row.names="SR_LN(R0)",
                      "LO"      = 5,
                      "HI"      = 20,
                      "INIT"    = 13,
                      "PRIOR"    = 0,
                      "PR_SD"    = 0,
                      "PR_type"  = 0,
                      "PHASE"    = 1,
                      "env_var&link" = 0,
                      "dev_link" = 0,
                      "dev_minyr" = 0,
                      "dev_maxyr" = 0,
                      "dev_PH"   = 0,
                      "Block"    = 0,
                      "Block_Fxn" = 0)
ctl1$SR_parms[1,]<-SR_parms1
##-----
SR_parms2<-data.frame(row.names="SR_SCAA_null",
                      "LO"      = 0.2,
                      "HI"      = 1,
                      "INIT"    = 0.88,
                      "PRIOR"    = 0.777,
                      "PR_SD"    = 0.113,
                      "PR_type"  = 2,
                      "PHASE"    = -4,
```



```

        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$SR_parms[2,] <-SR_parms2
##-----
SR_parms3<-data.frame(row.names="SR_sigmaR",
        "LO"          = 0.3,
        "HI"          = 1.6,
        "INIT"        = 0.6,
        "PRIOR"        = 1.1,
        "PR_SD"        = 99,
        "PR_type"      = 0,
        "PHASE"        = -6,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$SR_parms[3,] <-SR_parms3
##-----
SR_parms4<-data.frame(row.names="SR_regime",
        "LO"          = -5,
        "HI"          = 5,
        "INIT"        = 0,
        "PRIOR"        = 0,
        "PR_SD"        = 99,
        "PR_type"      = 0,
        "PHASE"        = -50,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$SR_parms[4,] <-SR_parms4
##-----
SR_parms5<-data.frame(row.names="SR_autocorr",
        "LO"          = 0,
        "HI"          = 2,
        "INIT"        = 0,
        "PRIOR"        = 1,
        "PR_SD"        = 99,
        "PR_type"      = 0,
        "PHASE"        = -50,
        "env_var&link" = 0,
        "dev_link"     = 0,

```

```

        "dev_minyr"      = 0,
        "dev_maxyr"      = 0,
        "dev_PH"         = 0,
        "Block"          = 0,
        "Block_Fxn"      = 0)
ctl1$SR_parms[5,] <- SR_parms5
##-----
# para revisar primeras columnas
ctl1$SR_parms[,1:6]
##          LO    HI  INIT PRIOR  PR_SD PR_type
## SR_LN(R0)   5.0 20.0 13.00 0.000  0.000      0
## SR_BH_steep 0.2  1.0  0.88 0.777  0.113      2
## SR_sigmaR   0.3  1.6  0.60 1.100 99.000      0
## SR_regime   -5.0  5.0  0.00 0.000 99.000      0
## SR_autocorr 0.0  2.0  0.00 1.000 99.000      0
##-----

```

3.11 Desvíos de los reclutamientos y sesgo

- do_recdev: 0=none; 1=devvector ($R=F(SSB)+dev$); 2=deviations ($R=F(SSB)+dev$); 3=deviations ($R=R0*dev$; $dev2=R-f(SSB)$); 4=like 3 with $\text{sum}(dev2)$ adding penalty
- MainRdevYrFirst: first year of main recr_devs; early devs can precede this era
- MainRdevYrLast: last year of main recr_devs; forecast devs start in following year
- recdev_phase:
- recdev_adv: (0/1) to read 13 advanced options
- recdev_early_start: (0=none; neg value makes relative to recdev_start)
- recdev_early_phase:
- Fcast_rec_r_phase: (incl. late recr) (0 value resets to maxphase+1)
- lambda4Fcast_recr_like: lambda for Fcast_recr_like occurring before endyr+1
- last_early_yr_nobias_adj: last_yr_nobias_adj_in_MPD; begin of ramp
- first_yr_fullbias_adj: first_yr_fullbias_adj_in_MPD; begin of plateau
- last_yr_fullbias_adj: last_yr_fullbias_adj_in_MPD
- first_recent_yr_nobias_adj: end_yr_for_ramp_in_MPD (can be in forecast to shape ramp, but SS3 sets bias_adj to 0.0 for fcast yrs)
- max_bias_adj: max_bias_adj_in_MPD; (typical ~0.8; -3 sets all years to 0.0; -2 sets all non-forecast yrs w/ estimated recdevs to 1.0; -1 sets biasadj=1.0 for all yrs w/ recdevs).
- period_of_cycles_in_rec_r: period of cycles in recruitment (N parms read below)
- min_rec_dev:
- max_rec_dev:
- N_Read_recdevs:

```

##-----
ctl1$do_recdev <- 1
ctl1$MainRdevYrFirst <- 1989
ctl1$MainRdevYrLast <- 2022
ctl1$recdev_phase <- 1

```

```

ctl1$recdev_adv      <- 0
ctl1$recdev_early_start <- NULL
ctl1$recdev_early_phase <- NULL
ctl1$Fcast_recr_phase <- NULL
ctl1$lambda4Fcast_recr_like <- NULL
ctl1$last_early_yr_nobias_adj <- NULL
ctl1$first_yr_fullbias_adj <- NULL
ctl1$last_yr_fullbias_adj <- NULL
ctl1$first_recent_yr_nobias_adj <- NULL
ctl1$max_bias_adj <- NULL
ctl1$period_of_cycles_in_recr <- NULL
ctl1$min_rec_dev <- NULL
ctl1$max_rec_dev <- NULL
ctl1$N_Read_recdevs <- NULL
##-----
# revisar salidas
ctl1[48:52]
## $do_recdev
## [1] 1
##
## $MainRdevYrFirst
## [1] 1989
##
## $MainRdevYrLast
## [1] 2022
##
## $recdev_phase
## [1] 1
##
## $recdev_adv
## [1] 0

```

3.12 Mortalidad por pesca

- F_ballpark: F ballpark value in units of annual_F
- F_ballpark_year: F ballpark year (neg value to disable)
- F_Method: 1=Pope midseason rate; 2=F as parameter; 3=F as hybrid; 4=fleet-specific parm/hybrid (#4 is superset of #2 and #3 and is recommended)
- maxF: max F (methods 2-4) or harvest fraction (method 1)
- F_iter: N iterations for tuning in hybrid mode; recommend 3 (faster) to 5 (more precise if many fleets)

```

##-----
ctl1$F_ballpark      <- 0.1
ctl1$F_ballpark_year <- -1989
ctl1$F_Method        <- 3
ctl1$maxF            <- 4
ctl1$F_iter          <- 3
##-----
# revisa salidas
ctl1[53:57]
## $F_ballpark
## [1] 0.1
##
## $F_ballpark_year

```

```
## [1] -1989
##
## $F_Method
## [1] 3
##
## $maxF
## [1] 4
##
## $F_iter
## [1] 3
#-----
```

3.13 Capturabilidad

3.13.1 Opciones de capturabilidad por flota (CPUE o CAMPAÑAS)

- `fleet`: number
- `link type`: (1=simple q, 1 parm;2=mirror simple q, 1 mirrored parm;3=q and power, 2 parm;4=mirror with offset, 2 parm)
- `link_info`: extra input for link, i.e. mirror fleet# or dev index number
- `extra_se`: 0/1 to select extra sd parameter
- `biasadj`: 0/1 for biasadj or not
- `float`: 0/1 to float

```
#-----
Q_options1<-data.frame(row.names="PELAGO",
                        "fleet"      = 2,
                        "link"       = 1,
                        "link_info"  = 0,
                        "extra_se"   = 0,
                        "biasadj"    = 0,
                        "float"      = 0)
ctl1$Q_options[1,]<-Q_options1
#-----
Q_options2<-data.frame(row.names="ECOCADIZ",
                        "fleet"      = 3,
                        "link"       = 1,
                        "link_info"  = 0,
                        "extra_se"   = 0,
                        "biasadj"    = 0,
                        "float"      = 0)
ctl1$Q_options[2,]<-Q_options2
#-----
#revisa salidas
ctl1$Q_options
##      fleet link link_info extra_se biasadj float
## SURVEY1    2   1         0         0         0   0
## SURVEY2    3   1         0         0         0   0
```

3.13.2 Parámetros

```
#-----
Q_parms1<-data.frame(row.names="LnQ_base_PELAGO(2)",
                      "LQ"          = -30,
```

```

      "HI"          = 15,
      "INIT"        = -0.158817,
      "PRIOR"       = 0,
      "PR_SD"       = 1,
      "PR_type"     = 0,
      "PHASE"       = 1,
      "env_var&link" = 0,
      "dev_link"    = 0,
      "dev_minyr"   = 0,
      "dev_maxyr"   = 0,
      "dev_PH"      = 0,
      "Block"       = 0,
      "Block_Fxn"   = 0)
ctl1$Q_parms[1,]<-Q_parms1
#-----
Q_parms2<-data.frame(row.names="LnQ_base_ECOCADIZ(3)",
      "LO"          = -30,
      "HI"          = 15,
      "INIT"        = 0.08918,
      "PRIOR"       = 0,
      "PR_SD"       = 1,
      "PR_type"     = 0,
      "PHASE"       = 1,
      "env_var&link" = 0,
      "dev_link"    = 0,
      "dev_minyr"   = 0,
      "dev_maxyr"   = 0,
      "dev_PH"      = 0,
      "Block"       = 0,
      "Block_Fxn"   = 0)
ctl1$Q_parms[2,]<-Q_parms2
#-----
#revisa salidas
ctl1$Q_parms
##           LO HI      INIT PRIOR PR_SD PR_type PHASE env_var&link
## LnQ_base_SURVEY1(2) -30 15 -0.158817    0    1    0    1          0
## Q_extraSD_SURVEY1(2) -30 15  0.089180    0    1    0    1          0
## LnQ_base_SURVEY2(3)  -7  5 -6.628100    0    1    0    1          0
##           dev_link dev_minyr dev_maxyr dev_PH Block Block_Fxn
## LnQ_base_SURVEY1(2)      0      0      0    0    0      0
## Q_extraSD_SURVEY1(2)      0      0      0    0    0      0
## LnQ_base_SURVEY2(3)      0      0      0    0    0      0

```

3.14 Selectividad

3.14.1 tipos de selectividad a la talla

- Pattern:_0; parm=0; selex=1.0 for all sizes
- Pattern:_1; parm=2; logistic; with 95% width specification
- Pattern:_5; parm=2; mirror another size selex; PARMS pick the min-max bin to mirror
- Pattern:_11; parm=2; selex=1.0 for specified min-max population length bin range
- Pattern:_15; parm=0; mirror another age or length selex
- Pattern:_6; parm=2+special; non-parm len selex
- Pattern:_43; parm=2+special+2; like 6, with 2 additional param for scaling (average over bin range)

- Pattern: `_8`; `parm=8`; double_logistic with smooth transitions and constant above Linf option
- Pattern: `_9`; `parm=6`; simple 4-parm double logistic with starting length; `parm 5` is first length; `parm 6=1` does desc as offset
- Pattern: `_21`; `parm=2+special`; non-parm len selex, read as pairs of size, then selex
- Pattern: `_22`; `parm=4`; double_normal as in CASAL
- Pattern: `_23`; `parm=6`; double_normal where final value is directly equal to `sp(6)` so can be >1.0
- Pattern: `_24`; `parm=6`; double_normal with `sel(minL)` and `sel(maxL)`, using joiners
- Pattern: `_2`; `parm=6`; double_normal with `sel(minL)` and `sel(maxL)`, using joiners, back compatible version of 24 with 3.30.18 and older
- Pattern: `_25`; `parm=3`; exponential-logistic in length
- Pattern: `_27`; `parm=special+3`; cubic spline in length; `parm1==1` resets knots; `parm1==2` resets all
- Pattern: `_42`; `parm=special+3+2`; cubic spline; like 27, with 2 additional param for scaling (average over bin range)
- discard_options: `_0=none`; `_1=define_retention`; `_2=retention&mortality`; `_3=all_discarded_dead`; `_4=define_dome-shaped_retention`

```
#-----
size_selex_types1<-data.frame(row.names="Fishery",
                             "Pattern" = 1,
                             "Discard" = 0,
                             "Male"    = 0,
                             "Special" = 0)
ctl1$size_selex_types[1,]<-size_selex_types1
#-----
size_selex_types2<-data.frame(row.names="PELAGO",
                             "Pattern" = 1,
                             "Discard" = 0,
                             "Male"    = 0,
                             "Special" = 0)
ctl1$size_selex_types[2,]<-size_selex_types2
#-----
size_selex_types3<-data.frame(row.names="ECOCADIZ",
                             "Pattern" = 1,
                             "Discard" = 0,
                             "Male"    = 0,
                             "Special" = 0)
ctl1$size_selex_types[3,]<-size_selex_types3
#-----
#revisa salidas
ctl1$size_selex_types
##      Pattern Discard Male Special
## FISHERY      1      0    0      0
## SURVEY1      1      0    0      0
## SURVEY2      1      0    0      0
```

3.14.2 tipos de selectividad a la edad

- Pattern: `_0`; `parm=0`; `selex=1.0` for ages 0 to maxage
- Pattern: `_10`; `parm=0`; `selex=1.0` for ages 1 to maxage
- Pattern: `_11`; `parm=2`; `selex=1.0` for specified min-max age
- Pattern: `_12`; `parm=2`; age logistic
- Pattern: `_13`; `parm=8`; age double logistic. Recommend using pattern 18 instead.
- Pattern: `_14`; `parm=nages+1`; age empirical
- Pattern: `_15`; `parm=0`; mirror another age or length selex
- Pattern: `_16`; `parm=2`; Coleraine - Gaussian

- Pattern:_17; parm=nages+1; empirical as random walk N parameters to read can be overridden by setting special to non-zero
- Pattern:_41; parm=2+nages+1; // like 17, with 2 additional param for scaling (average over bin range)
- Pattern:_18; parm=8; double logistic - smooth transition
- Pattern:_19; parm=6; simple 4-param double logistic with starting age
- Pattern:_20; parm=6; double_normal,using joiners
- Pattern:_26; parm=3; exponential-logistic in age
- Pattern:_27; parm=3+special; cubic spline in age; parm1==1 resets knots; parm1==2 resets all
- Pattern:_42; parm=2+special+3; // cubic spline; with 2 additional param for scaling (average over bin range)
- Age patterns entered with value >100 create Min_selage from first digit and pattern from remainder

```
#-----
age_selex_types1<-data.frame(row.names="Fishery",
                             Pattern = 12,
                             Discard = 0,
                             Male     = 0,
                             Special = 0)
ctl1$age_selex_types[1,]<-age_selex_types1
#-----
age_selex_types2<-data.frame(row.names="PELAGO",
                             Pattern = 12,
                             Discard = 0,
                             Male     = 0,
                             Special = 0)
ctl1$age_selex_types[2,]<-age_selex_types2
#-----
age_selex_types3<-data.frame(row.names="ECOCADIZ",
                             Pattern = 12,
                             Discard = 0,
                             Male     = 0,
                             Special = 0)
ctl1$age_selex_types[3,]<-age_selex_types3
#-----
#revisa salidas
ctl1$age_selex_types
##      Pattern Discard Male Special
## FISHERY      12      0    0      0
## SURVEY1      12      0    0      0
## SURVEY2      12      0    0      0
```

3.14.3 parametros de selectividad a la talla

```
#-----
size_selex_parms1<-data.frame(row.names="SizeSel_P_1_Fishery(1)",
                              "LO"      = -1,
                              "HI"      = 20,
                              "INIT"     = 12,
                              "PRIOR"    = 0,
                              "PR_SD"    = 0,
                              "PR_type"  = 0,
                              "PHASE"    = 2,
                              "env_var&link" = 0,
```

```

        "dev_link"      = 0,
        "dev_minyr"     = 0,
        "dev_maxyr"     = 0,
        "dev_PH"        = 0.5,
        "Block"         = 0,
        "Block_Fxn"     = 0)
ctl1$size_selex_parms[1,]<-size_selex_parms1
#-----
size_selex_parms2<-data.frame(row.names="SizeSel_P_1_Fishery(1)",
        "LO"           = -1,
        "HI"           = 20,
        "INIT"         = 18,
        "PRIOR"        = 0,
        "PR_SD"        = 0,
        "PR_type"      = 0,
        "PHASE"        = 2,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0.5,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$size_selex_parms[2,]<-size_selex_parms2
#-----
size_selex_parms3<-data.frame(row.names="SizeSel_P_1_PELAGO(2)",
        "LO"           = -3,
        "HI"           = 8,
        "INIT"         = 6,
        "PRIOR"        = 0,
        "PR_SD"        = 0,
        "PR_type"      = 0,
        "PHASE"        = 3,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,
        "dev_maxyr"    = 0,
        "dev_PH"       = 0.5,
        "Block"        = 0,
        "Block_Fxn"    = 0)
ctl1$size_selex_parms[3,]<-size_selex_parms3
#-----
size_selex_parms4<-data.frame(row.names="SizeSel_P_2_PELAGO(2)",
        "LO"           = -3,
        "HI"           = 16,
        "INIT"         = 10,
        "PRIOR"        = 0,
        "PR_SD"        = 0,
        "PR_type"      = 0,
        "PHASE"        = 3,
        "env_var&link" = 0,
        "dev_link"     = 0,
        "dev_minyr"    = 0,

```



```

        "dev_maxyr"      = 0,
        "dev_PH"         = 0.5,
        "Block"          = 0,
        "Block_Fxn"      = 0)
ctl1$size_selex_parms[4,]<-size_selex_parms4
#-----
size_selex_parms5<-data.frame(row.names="SizeSel_P_1_ECOCADIZ(3)",
        "LO"             = -1,
        "HI"             = 10,
        "INIT"           = 8,
        "PRIOR"          = 0,
        "PR_SD"          = 0,
        "PR_type"        = 0,
        "PHASE"          = 3,
        "env_var&link"    = 0,
        "dev_link"       = 0,
        "dev_minyr"      = 0,
        "dev_maxyr"      = 0,
        "dev_PH"         = 0.5,
        "Block"          = 0,
        "Block_Fxn"      = 0)
ctl1$size_selex_parms[5,]<-size_selex_parms5
#-----
size_selex_parms6<-data.frame(row.names="SizeSel_P_2_ECOCADIZ(3)",
        "LO"             = -1,
        "HI"             = 20.5,
        "INIT"           = 15,
        "PRIOR"          = 0,
        "PR_SD"          = 0,
        "PR_type"        = 0,
        "PHASE"          = 3,
        "env_var&link"    = 0,
        "dev_link"       = 0,
        "dev_minyr"      = 0,
        "dev_maxyr"      = 0,
        "dev_PH"         = 0.5,
        "Block"          = 0,
        "Block_Fxn"      = 0)
ctl1$size_selex_parms[6,]<-size_selex_parms6
#-----
# revisa salidas
ctl1$size_selex_parms
##
##      LO      HI  INIT PRIOR PR_SD PR_type PHASE env_var&link
## SizeSel_P_1_FISHERY(1) -1 20.0  12   0   0   0   2         0
## SizeSel_P_2_FISHERY(1) -1 20.0  18   0   0   0   2         0
## SizeSel_P_1_SURVEY1(2) -3  8.0   6   0   0   0   3         0
## SizeSel_P_2_SURVEY1(2) -3 16.0  10   0   0   0   3         0
## SizeSel_P_1_ECOCADIZ(3) -1 10.0   8   0   0   0   3         0
## SizeSel_P_2_ECOCADIZ(3) -1 20.5  15   0   0   0   3         0
##
##      dev_link dev_minyr dev_maxyr dev_PH Block Block_Fxn
## SizeSel_P_1_FISHERY(1)      0      0      0  0.5     0      0
## SizeSel_P_2_FISHERY(1)      0      0      0  0.5     0      0
## SizeSel_P_1_SURVEY1(2)      0      0      0  0.5     0      0

```

## SizeSel_P_2_SURVEY1(2)	0	0	0	0.5	0	0
## SizeSel_P_1_ECOCADIZ(3)	0	0	0	0.5	0	0
## SizeSel_P_2_ECOCADIZ(3)	0	0	0	0.5	0	0

3.14.4 parametros de selectividad a la edad

```
#-----
age_selex_parms1<-data.frame(row.names="AgeSel_P_1_Fishery(1)",
                             "LO"          = -2.0,
                             "HI"          = 5.50,
                             "INIT"        = 0.10,
                             "PRIOR"       = 0,
                             "PR_SD"       = 0.01,
                             "PR_type"     = 0,
                             "PHASE"       = -1,
                             "env_var&link" = 0,
                             "dev_link"    = 0,
                             "dev_minyr"   = 0,
                             "dev_maxyr"   = 0,
                             "dev_PH"      = 0.5,
                             "Block"       = 0,
                             "Block_Fxn"   = 0)
ctl1$age_selex_parms[1,]<-age_selex_parms1
#-----
age_selex_parms2<-data.frame(row.names="AgeSel_P_2_Fishery(1)",
                             "LO"          = -1.0,
                             "HI"          = 5.50,
                             "INIT"        = 5.0,
                             "PRIOR"       = 0,
                             "PR_SD"       = 0.01,
                             "PR_type"     = 0,
                             "PHASE"       = -1,
                             "env_var&link" = 0,
                             "dev_link"    = 0,
                             "dev_minyr"   = 0,
                             "dev_maxyr"   = 0,
                             "dev_PH"      = 0.5,
                             "Block"       = 0,
                             "Block_Fxn"   = 0)
ctl1$age_selex_parms[2,]<-age_selex_parms2
#-----
age_selex_parms3<-data.frame(row.names="AgeSel_P_1_PELAGO(2)",
                             "LO"          = -2.0,
                             "HI"          = 5.50,
                             "INIT"        = 0.10,
                             "PRIOR"       = 0,
                             "PR_SD"       = 0.01,
                             "PR_type"     = 0,
                             "PHASE"       = -1,
                             "env_var&link" = 0,
                             "dev_link"    = 0,
                             "dev_minyr"   = 0,
                             "dev_maxyr"   = 0,
```

```

        "dev_PH"      = 0.5,
        "Block"       = 0,
        "Block_Fxn"   = 0)
ctl1$age_selex_parms[3,]<-age_selex_parms3
#-----
age_selex_parms4<-data.frame(row.names="AgeSel_P_2_PELAGO(2)",
        "LO"          = -1.0,
        "HI"          = 5.50,
        "INIT"        = 5.00,
        "PRIOR"       = 0,
        "PR_SD"       = 0.01,
        "PR_type"     = 0,
        "PHASE"       = -1,
        "env_var&link" = 0,
        "dev_link"    = 0,
        "dev_minyr"   = 0,
        "dev_maxyr"   = 0,
        "dev_PH"      = 0.5,
        "Block"       = 0,
        "Block_Fxn"   = 0)
ctl1$age_selex_parms[4,]<-age_selex_parms4
#-----
age_selex_parms5<-data.frame(row.names="AgeSel_P_1_ECOCADIZ(3)",
        "LO"          = -2.0,
        "HI"          = 5.50,
        "INIT"        = 0.10,
        "PRIOR"       = 0,
        "PR_SD"       = 0.01,
        "PR_type"     = 0,
        "PHASE"       = -1,
        "env_var&link" = 0,
        "dev_link"    = 0,
        "dev_minyr"   = 0,
        "dev_maxyr"   = 0,
        "dev_PH"      = 0.5,
        "Block"       = 0,
        "Block_Fxn"   = 0)
ctl1$age_selex_parms[5,]<-age_selex_parms5
#-----
age_selex_parms6<-data.frame(row.names="AgeSel_P_2_ECOCADIZ(3)",
        "LO"          = -1.0,
        "HI"          = 5.50,
        "INIT"        = 5.00,
        "PRIOR"       = 0,
        "PR_SD"       = 0.01,
        "PR_type"     = 0,
        "PHASE"       = -1,
        "env_var&link" = 0,
        "dev_link"    = 0,
        "dev_minyr"   = 0,
        "dev_maxyr"   = 0,
        "dev_PH"      = 0.5,
        "Block"       = 0,

```

```

                                "Block_Fxn"      = 0)
ctl1$age_selex_parms[6,]<-age_selex_parms6
#-----
# revisa salidas
ctl1$age_selex_parms
##          LO  HI  INIT PRIOR PR_SD PR_type PHASE env_var&link
## AgeSel_P_1_FISHERY(1) -2 5.5 0.1    0 0.01    0   -1      0
## AgeSel_P_2_FISHERY(1) -1 5.5 5.0    0 0.01    0   -1      0
## AgeSel_P_1_SURVEY1(2) -2 5.5 0.1    0 0.01    0   -1      0
## AgeSel_P_2_SURVEY1(2) -1 5.5 5.0    0 0.01    0   -1      0
## AgeSel_P_1_SURVEY2(3) -2 5.5 0.1    0 0.01    0   -1      0
## AgeSel_P_2_SURVEY2(3) -1 5.5 5.0    0 0.01    0   -1      0
##          dev_link dev_minyr dev_maxyr dev_PH Block Block_Fxn
## AgeSel_P_1_FISHERY(1)      0      0      0    0.5    0      0
## AgeSel_P_2_FISHERY(1)      0      0      0    0.5    0      0
## AgeSel_P_1_SURVEY1(2)      0      0      0    0.5    0      0
## AgeSel_P_2_SURVEY1(2)      0      0      0    0.5    0      0
## AgeSel_P_1_SURVEY2(3)      0      0      0    0.5    0      0
## AgeSel_P_2_SURVEY2(3)      0      0      0    0.5    0      0

```

3.14.5 otros parámetros

- Use_2D_AR1_selectivity: use 2D_AR1 selectivity(0/1)
- TG_custom: 0=no read and autogen if tag data exist; 1=read
- DoVar_adjust: 1= add_to_survey_CV; 2=add_to_discard_stddev; 3=add_to_bodywt_CV; 4=mult_by_lencomp_N; 5=mult_by_agecomp_N; 6=mult_by_size-at-age_N; 7=mult_by_generalized_sizecomp
- Variance_adjustment_list:
- maxlambdaphase:
- sd_offset: must be 1 if any growthCV, sigmaR, or survey extraSD is an estimated parameter
- maxlambdaphase:
- sd_offset:
- lambdas:
- N_lambdas:
- more_stddev_reporting:
- stddev_reporting_specs:
- stddev_reporting_selex:
- stddev_reporting_growth:
- stddev_reporting_N_at_A:

```

#-----
ctl1$Use_2D_AR1_selectivity <-0
ctl1$TG_custom              <-0
ctl1$DoVar_adjust           <-1
# revisa salidas
ctl1[64:66]
## $Use_2D_AR1_selectivity
## [1] 0
##
## $TG_custom
## [1] 0
##
## $DoVar_adjust
## [1] 1

```

```

#-----
varadj1<-data.frame(row.names="Variance_adjustment_list1",
                    "Factor"  = 4,
                    "Fleet"   = 1,
                    "Value"   = 0.0045)
#ctl1$Variance_adjustment_list[1,<-varadj1
#-----
varadj2<-data.frame(row.names="Variance_adjustment_list2",
                    "Factor"  = 4,
                    "Fleet"   = 2,
                    "Value"   = 0.0051)
#ctl1$Variance_adjustment_list[2,<- varadj2
#-----
varadj3<-data.frame(row.names="Variance_adjustment_list3",
                    "Factor"  = 4,
                    "Fleet"   = 3,
                    "Value"   = 0.0047)
#ctl1$Variance_adjustment_list[3,<-varadj3
#-----
# revisar salidas
#ctl1$Variance_adjustment_list <- NULL
#ctl1$Variance_adjustment_list
#-----
ctl1$maxlambdaphase      <- 1
ctl1$sd_offset           <- 1
ctl1$lambdas             <- NULL
ctl1$N_lambdas           <- 0
ctl1$more_stddev_reporting <- 0
ctl1$stddev_reporting_specs <- NULL
ctl1$stddev_reporting_selex <- NULL
ctl1$stddev_reporting_growth <- NULL
ctl1$stddev_reporting_N_at_A <- NULL
#-----
ctl1[68:71]
## $sd_offset
## [1] 1
##
## $N_lambdas
## [1] 0
##
## $more_stddev_reporting
## [1] 0
##
## $<NA>
## NULL

```

3.14.6 Escribir archivo de control modificado con la función SS_write para el enfoque de modelación SS3

```

#-----
r4ss::SS_writectl(ctl1,
                  outfile=here(dirname.mod,"control.ss"),
                  overwrite = TRUE)

```

#