Class 'OM'

An object containing all the parameters needed to control the MSE which can be build from component Stock, Fleet and Obs objects. Almost all of these inputs are a vector of length 2 which describes the upper and lower bounds of a uniform distribution from which to sample the parameter.

Slots

Name
Name of the operating model

nsim
The number of simulations

proyears
The number of projected years

nyears
The number of years for the historical simulation

maxage
The maximum age of individuals that is simulated (there is no 'plus group': individuals die off beyone the maximum age so there isn't a huge cost to simulating more older age classes)

R0
The magnitude of unfished recruitment. This is normally fixed to some arbitrary value since it simply scales the simulated numbers)

M
Natural mortality rate (uniform distribution)

Msd
Inter-annual variability in natural mortality rate expressed as a coefficient of variation (uniform distribution)

Mgrad
Mean temporal trend in natural mortality rate, expressed as a percentage change in M per year (uniform distribution)

h
Steepness of the stock recruit relationship (uniform distribution)

SRrel
Type of stock-recruit relationship (1)Beverton-Holt (2) Ricker

Linf
Maximum length (uniform distribution)

K
von B. growth parameter k (uniform distribution)

t0
von B. theoretical age at length zero (uniform distribution)

Ksd
Inter-annual variability in growth parameter k (uniform distribution)

Kgrad
Mean temporal trend in growth parameter k, expressed as a percentage change in k per year (uniform distribution)

Linfsd
Inter-annual variability in maximum length - uniform distribution

Linfgrad
Mean temporal trend in maximum length, expressed as a percentage change in Linf per year (uniform distribution)

recgrad
Mean temporal trend in log-normal recruitment deviations (uniform distribution)

AC
Autocorrelation in recruitment deviations rec(t)=AC*rec(t-1)+(1-AC)*sigma(t) (uniform distribution)

a
Length-weight parameter alpha (uniform distribution)

b
Length-weight parameter beta (uniform distribution)

D
Current level of stock depletion (Bcurrent/Bunfished) (uniform distribution)

Size_area_1

The size of area 1 relative to area 2 (uniform distribution)

Frac_area_1
The fraction of the unfished biomass in stock 1 (uniform distribution)

Prob_staying
The probability of inviduals in area 1 remaining in area 1 over the course of one year

beta
A parameter controlling hyperstability/hyperdepletion. I^beta therefore values below 1 lead to hyperstability (an index that decreases slower than true abundance) and values above 1 lead to hyperdepletion (an index that decreases more rapidly than true abundance)(uniform distribution)

Spat_targ
Distribution of fishing in relation to spatial biomass: F is proportional to B^Spat_targ (uniform distribution)

LFS
Shortest length that is fully vulnerable to fishing (uniform distribution)

L5
Shortest length at 5 percent vulnerability (uniform distribution)

Vmaxlen
The vulnerability of the longest (oldest) fish (uniform distribution)

SelYears
Vector of verticies that index years where historical selectivity pattern changed. Leave empty to ignore

AbsSelYears
vector of absolute year values that correspond to year indices in SelYears. Used only for plotting

L5Lower
Optional vector of values of length SelYears, specifiying lower limits of L5 (use `ChooseSelect` function to set these. Overrides L5 above)

L5Upper
Optional vector of values of length SelYears, specifiying upper limits of L5 (use `ChooseSelect` function to set these. Overrides L5 above)

LFSLower
Optional vector of values of length SelYears, specifiying lower limits of LFS (use `ChooseSelect` function to set these. Overrides LFS above)

LFSUpper
Optional vector of values of length SelYears, specifiying upper limits of LFS (use `ChooseSelect` function to set these. Overrides LFS above)

VmaxLower
Optional vector of values of length SelYears, specifiying lower limits of Vmaxlen (use `ChooseSelect` function to set these. Overrides Vmaxlen above)

VmaxUpper
Optional vector of values of length SelYears, specifiying upper limits of Vmaxlen (use `ChooseSelect` function to set these. Overrides Vmaxlen above)

isRel
Are the selectivity parameters relative to size-of-maturity? TRUE or FALSE

L50
Length at 50 percent maturity (uniform distribution)

L50_95
Length increment from 50 to 95 percent maturity (uniform distribution)

Esd
Inter-annual variability in fishing mortality rate

EffYears
Vector of verticies, years at which to simulate varying relative effort

EffLower
Lower bound on relative effort corresponding to EffYears (uniform distribution)

EffUpper
Uppper bound on relative effort corresponding to EffYears (uniform distribution)

qinc
Average percentage change in fishing efficiency (uniform distribution)(applicable only to forward projection and input controls)

qcv
Inter-annual variability in fishing efficiency (uniform distribution)(applicable only to forward projection and input controls)

CurrentYr
The current calendar year (final year) of the historical simulations (e.g. 2011)

Cobs
Log-normal catch observation error expressed as a coefficient of variation (uniform distribution)

Cbiascv
A coefficient of variation controlling the sampling of bias in catch observations for each simulation (uniform distribution)

CAA_nsamp
Number of catch-at-age observation per time step (uniform distribution)

CAA_ESS
Effective sample size (independent age draws) of the multinomial catch-at-age observation error model (uniform distribution)

CAL_nsamp
Number of catch-at-length observation per time step (uniform distribution)

CAL_ESS
Effective sample size (independent length draws) of the multinomial catch-at-length observation error model (uniform distribution)

CALcv
Lognormal, variability in the length at age (uniform distribution)

Iobs
Observation error in the relative abundance indices expressed as a coefficient of variation (uniform distribution)

Perr
The extent of inter-annual log-normal recruitment variability (sigma R)(uniform distribution)

Period
Period for cylical recruitment pattern in years (uniform distribution). Leave empty to ignore

Amplitude
Amplitude in deviation from long-term average recruitment during recruitment cycle, both positive and negative (uniform distribution). E.g., a range from 0 to 0.5 means recruitment decreases or increases by up to 50% each cycle. Leave empty to ignore

Mcv
Persistent bias in the prescription of natural mortality rate sampled from a log-normal distribution with coefficient of variation (Mcv)(uniform distribution)

Kcv
Persistent bias in the prescription of growth parameter k sampled from a log-normal distribution with coefficient of variation (Kcv)(uniform distribution)

t0cv
Persistent bias in the prescription of t0 sampled from a log-normal distribution with coefficient of variation (t0cv)(uniform distribution)

Linfcv
Persistent bias in the prescription of maximum length sampled from a log-normal distribution with coefficient of variation (Linfcv)(uniform distribution)

LFCcv
Persistent bias in the prescription of lenght at first capture sampled from a log-normal distribution with coefficient of variation (LFCcv)(uniform distribution)

LFScv
Persistent bias in the prescription of length-at-fully selection sampled from a log-normal distribution with coefficient of variation (LFScv)(uniform distribution)

B0cv
Persistent bias in the prescription of maximum lengthunfished biomass sampled from a log-normal distribution with coefficient of variation (B0cv)(uniform distribution)

FMSYcv
Persistent bias in the prescription of FMSY sampled from a log-normal distribution with coefficient of variation (FMSYcv)(uniform distribution)

FMSY_Mcv
Persistent bias in the prescription of FMSY/M sampled from a log-normal distribution with coefficient of variation (FMSY_cv)(uniform distribution)

BMSY_B0cv
Persistent bias in the prescription of BMsY relative to unfished sampled from a log-normal distribution with coefficient of variation (BMSY_B0cv)(uniform distribution)

rcv
Persistent bias in the prescription of intrinsic rate of increase sampled from a log-normal distribution with coefficient of variation (rcv)(uniform distribution)

LenMcv
Persistent bias in the prescription of length at 50 percent maturity sampled from a log-normal distribution with coefficient of variation (A50cv)(uniform distribution)

Dbiascv
Persistent bias in the prescription of stock depletion sampled from a log-normal distribution with coefficient of variation (Linfcv)(uniform distribution)

Dcv
Imprecision in the prescription of stock depletion among years, expressed as a coefficient of variation (uniform distribution)

Btbias
Persistent bias in the prescription of current stock biomass sampled from a uniform-log distribution with range (Btbias)(uniform distribution)

Btcv
Imprecision in the prescription of current stock biomass among years expressed as a coefficient of variation (uniform distribution)

Fcurbiascv
Persistent bias in the prescription of current fishing mortality rate sampled from a log-normal distribution with coefficient of variation (Fcurcv)(uniform distribution)

Fcurcv
Imprecision in the prescription of current fishing mortality rate among years expressed as a coefficient of variation (uniform distribution)

hcv
Persistent bias in steepness (uniform distribution)

Icv
Observation error in realtive abundance index expressed as a coefficient of variation (uniform distirbution)

maxagecv
Bias in the prescription of maximum age (uniform distribution)

Reccv
Bias in the knowledge of recent recruitment strength (uniform distribution)

Irefcv
Bias in the knowledge of the relative abundance index at BMSY (uniform distribution)

Brefcv
Bias in the knowledge of BMSY (uniform distribution)

Crefcv
Bias in the knowledge of MSY(uniform distribution)

cpars
A list of custom parameters (single parameters are a vector nsim long, time series are a matrix nsim rows by nyears columns)

seed
A random seed to ensure users can reproduce results exactly

Source
A reference to a website or article form which parameters were taken to define the operating model

TACSD
lognormal standard deviation in fraction of TAC taken (uniform distribution)

TACFrac
Mean fraction of TAC taken (uniform distribution) (can be an improper fraction greater than 1)

ESD
lognormal standard deviation in fraction of TAE taken(uniform distribution)

EFrac
Mean fraction of recommended effort taken (uniform distribution)

SizeLimSD
lognormal error in size limit implementation (uniform distribution)

SizeLimFrac
Mean fraction of the size limit (uniform distribution) (can be an improper fraction greater than 1)

DiscMort
Discard mortality rate (uniform distribution) (can be an improper fraction greater than 1)

Objects from the Class

Objects can be created by calls of the form `new('OM', Stock, Fleet, Obs, Imp)`.

Examples

```
showClass('OM')
#> Class "OM" [package "DLMtool"]
#>
#> Slots:
#>
#> Name:          Name         nsim     proyears       nyears       maxage
#> Class:    character      numeric      numeric      numeric      numeric
#>
#> Name:            R0            M          Msd        Mgrad            h
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:         SRrel         Linf            K           t0          Ksd
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:         Kgrad       Linfsd     Linfgrad      recgrad            a
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:             b            D  Size_area_1  Frac_area_1 Prob_staying
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:        Source          L50       L50_95     SelYears  AbsSelYears
#> Class:    character      numeric      numeric      numeric      numeric
#>
#> Name:           L5          LFS      Vmaxlen      L5Lower      L5Upper
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:      LFSLower     LFSUpper    VmaxLower    VmaxUpper        isRel
#> Class:      numeric      numeric      numeric      numeric    character
#>
#> Name:          beta    Spat_targ          Esd       Period    Amplitude
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:      EffYears     EffLower     EffUpper         qinc          qcv
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:            AC         Cobs      Cbiascv    CAA_nsamp      CAA_ESS
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:     CAL_nsamp      CAL_ESS        CALcv         Iobs         Perr
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:           Mcv          Kcv         t0cv       Linfcv        LFCcv
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:         LFScv         B0cv       FMSYcv     FMSY_Mcv    BMSY_B0cv
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:        LenMcv          rcv      Dbiascv          Dcv       Btbias
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:          Btcv   Fcurbiascv       Fcurcv          hcv          Icv
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:      maxagecv        Reccv       Irefcv       Crefcv       Brefcv
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:         TACSD      TACFrac          ESD        EFrac    SizeLimSD
#> Class:      numeric      numeric      numeric      numeric      numeric
#>
#> Name:   SizeLimFrac     DiscMort        cpars         seed    CurrentYr
#> Class:      numeric      numeric         list      numeric      numeric
```
