

Observation Error Model Explained

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Observation error in data sources

- Catch.
- Survey.
- CPUE.
- Could be also biology (maturity, growth).

Deviances

- Created at simulation setup.
- Observation error over simulation period.
- Could be recreated inside oem if needed.

Index deviances and catchabilities

```
# PREDICTION of Q  
i.q0 <- predict(fit)$qmodel[[i]]  
  
# FIT of index  
i.fit <- window(index(fit)[[i]], end=fy)  
  
# NEW survey  
idx_temp <- FLIndex(index=i.fit, index.q=i.q)  
  
# TIMING of survey  
range(idx_temp)[c("startf", "endf")] <-  
  range(idxs[[i]])[6:7]
```

sampling.oem: catch

```
# CATCH in OM * deviances (+1)
catch.n(observations$stk)[,max(dataYears)] <-
  catch.n(stk)[,max(dataYears)] *
  deviances$stk$catch.n[,max(dataYears)] + 1

# GET total catch
catch(observations$stk)[,max(dataYears)] <-
  computeCatch(observations$stk[,max(dataYears)])

# SUBSET observed years
stk0 <- observations$stk[,dataYears]
```

sampling.oem: index

```
for (idx_count in 1:length(observations$idx)){  
  
  # index = stock.n * deviances  
  index(observations$idx[[idx_count]])[,max(dataYears)] <-  
    stock.n(stk)[,max(dataYears)] *  
    deviances$idx[[idx_count]][,max(dataYears)]  
}  
  
# SUBSET years  
idx0 <- lapply(observations$idx,  
  function(x) x[,dataYears])
```

perfect.oem

- Test your MP under ideal circumstances.

```
perfect.oem <- function(stk, deviances, observations,
  vy0, ay, tracking){

  dataYears <- vy0
  assessmentYear <- ac(ay)
  stk0 <- stk[,dataYears]
  idx0 <- FLIndices(
    a=FLIndex(index=stock.n(stk)[,dataYears]*0.01))
    range(idx0[[1]])[c("startf","endf")] <- c(0,0)

  list(stk=stk0, idx=idx0, deviances=deviances,
    observations=observations, tracking=tracking)
}
```

cpue.oem

```
# GET historical cpue
cpue <- window(observations$idx[[1]], end=ay[length(ay)])

# TIME of observation
ctime <- sum(range(cpue)[c("startf", "endf")]) / 2

# GENERATE new observation of abundance
obs <- quantSums(stock.n(stk)[,say] *
  exp(-harvest(stk)[,say] * ctime - m(stk)[,say] * ctime) *
  stock.wt(stk)[,say] * sel.pattern(cpue)[,say])

# NEW index
index(cpue)[,say] <- obs * index.q(cpue)[,say]
  * deviances$idx[,say]
```