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y1 = pracma::randn(100,1)
y2 = abs(pracma::randn(100,1)) + .2*y1
y3 = abs(pracma::randn(100,1)) + .1*y2
times=1:100
id=rep(1,100)
y = as.data.frame(cbind(y1, y2, y3))
colnames(y) <- paste0("V",1:3)
builddata = cbind(id, y, times)
data <- dynr::dynr.data(builddata,
                        id="id", time="times",
                        observed=paste0("V",1:3))

C0 = matrix(c(1:3, (1:3)^2), ncol = 2)

meas <- dynr::prep.measurement(values.load= C0,
                               params.load= matrix('fixed', 3, 2),
                               state.names = c("x1","x2"),
                               obs.names = paste0("V",1:3) )

A0 = diag(2)
EC = matrix(0, nrow=2, ncol=1)
dynamics <- dynr::prep.matrixDynamics(values.dyn = A0,
                                       params.dyn = matrix(paste0('theta',1:4), 2, 2),
                                       values.int = EC,
                                       params.int = matrix(paste0('ec',1:4), 2, 1),
                                       isContinuousTime = FALSE)

my.matrixa <- pracma::Toeplitz(paste0('va',1:3))

W = diag(2)
V = pracma::Toeplitz(c(1,.75,.5))

ecov <- dynr::prep.noise(values.latent = W,
                        params.latent = diag(c('w1','w2')),
                        values.observed = V,
                        params.observed = my.matrixa)

init.ix = matrix(0, nrow=2, ncol=1)
initP = 10^7*diag(2)

initial <- dynr::prep.initial(values.inistate = init.ix,
                              params.inistate = rep('fixed',2),
                              values.inicov = initP,
                              params.inicov = diag('fixed', 2))

model <- dynr::dynr.model(dynamics=dynamics,
                          measurement=meas,
                          noise=ecov,

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initial=initial,  
data=data,  
outfile="minimal.c"
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)
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