Time Unit Hierarchical Model with Stan

Prophet model

```
model {
  //priors
  k ~ normal(0, 5);
  m ~ normal(0, 5);
  delta ~ double_exponential(0, tau);

  beta ~ normal(0, sigmas);
  sigma_obs ~ normal(0, 0.5);

  // likelihood
  y ~ normal(
                linear_trend(k, m, delta, t, A, t_change)
                + X * (beta),
                sigma_obs);
}
```

TUH model

```
model{
  //hyperprior
  k_mu ~ normal
  k_sigma ~ Inv-gamma
  m_mu ~ normal
  m_sigma ~ Inv-gamma
  tau ~ normal
  for (k in 1:K){ sigmas[k] ~ Inv-gamma }

  //priors
  for (c in 1:C){
    k[c] ~ normal(k_mu, k_sigma);
    m[c] ~ normal(m_mu, m_sigma);
    delta[c] ~ double_exp(0,tau)
    for (k in 1:K){ beta[c,k] ~ normal(0, sigmas[k]) }
    }
    sigma_obs ~ normal(0, 0.5)

  //likelihood
  for(t in 1:T){
    y[t] ~ normal(
                linear_trend( k[TUC[t]], m[TUC[t]], delta[TUC[t]], t, A, t_chg)
                + X * (beta[TUC[t]]),
                sigma_obs)
  }
}
```

nextopt