Ecological Modeling and Forecasting

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Preface

This is a Quarto book.

To learn more about Quarto books visit https://quarto.org/docs/books.

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```

1 Introduction

This is a book created from markdown and executable code.

See Knuth (1984) for additional discussion of literate programming.

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2 Setting the stage

2.1 Background R skills

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3 Process model

```r
SSEM.orig <- function(X, params, inputs, timestep = 3600){

  ne <- nrow(X)  ## ne = number of ensemble members

  ##Unit Converstion: umol/m2/sec to Mg/ha/timestep
  k <- 1e-6 * 12 * 1e-6 * 10000 * timestep #mol/umol*gC/mol*Mg/g*m2/ha*sec/timestep

  ## photosynthesis
  LAI <- X[, 1] * params$SLA * 0.1  #0.1 is conversion from Mg/ha to kg/m2
  GPP <- pmax(0, params$alpha * (1 - exp(-0.5 * LAI)) * inputs$PAR)
  GPP[inputs$PAR < 1e-20] = 0 ## night

  ## respiration & allocation
  NPP <- GPP * params$Ra_frac

  leaf_alloc <- NPP * params$leaf_frac
  wood_alloc <- NPP * (1 - params$leaf_frac)

  Rh <- pmax(params$Rbasal * X[, 3] * params$Q10 ^ (inputs$temp / 10), 0) ## pmax ensures

  ## turnover
  litterfall <- X[, 1] * params$litterfall
  mortality <- X[, 2] * params$mortality

  ## update states
  leaves <- pmax(rnorm(ne, X[, 1] + leaf_alloc * k - litterfall, params$sigma.leaf), 0)
  wood <- pmax(rnorm(ne, X[, 2] + wood_alloc * k - mortality, params$sigma.stem), 0)
  SOM <- pmax(rnorm(ne, X[, 3] + litterfall + mortality - Rh * k, params$sigma.soil), 0)

  return(cbind(X1 = leaves,
               X2 = wood,
               X3 = SOM,
               LAI = leaves * params$SLA * 0.1,
               GPP = GPP,
```

```
                        NEP = NPP - Rh,
                        Ra = GPP - NPP,
                        NPPw = wood_alloc,
                        NPPl = leaf_alloc,
                        Rh = Rh,
                        litterfall = litterfall,
                        mortality = mortality))

}
```

4 Summary

In summary, this book has no content whatsoever.

```
1 + 1
```

```
[1] 2
```

References

Knuth, Donald E. 1984. "Literate Programming." *Comput. J.* 27 (2): 97–111. https://doi.org/10.1093/comjnl/27.2.97.