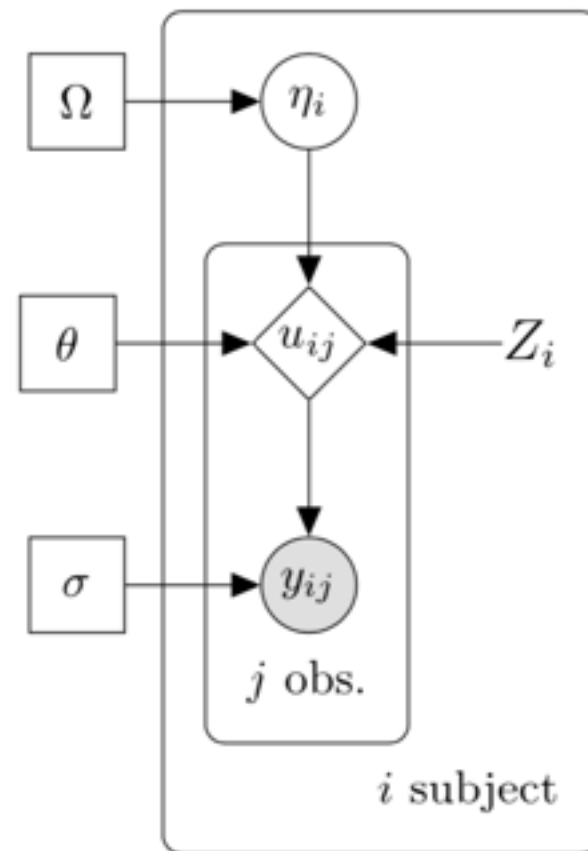


Non Linear Mixed Effects Models



The models are defined by three components

1. Random Effects
2. Dynamics
3. Observations

Defining NLME Models in PuMaS

```
1 nlme_model = @model begin
2   @param begin
3     θ ∈ VectorDomain(3,init=[3.24467E+01, 8.72879E-02, 1.49072E+00])
4     Ω ∈ PSDDomain(init=Matrix{Float64}([ 1.93973E-02  1.20854E-02  5.69131E-02
5                                           1.20854E-02  2.02375E-02 -6.47803E-03
6                                           5.69131E-02 -6.47803E-03  4.34671E-01]))
7     Σ ∈ PDiagDomain(init=[1.70385E-02, 8.28498E-02])
8   end
9
10  @random begin
11    η ~ MvNormal(Ω)
12  end
13
14  @pre begin
15    V = θ[1] * exp(η[1])
16    Ke = θ[2] * exp(η[2])
17    Ka = θ[3] * exp(η[3])
18    CL = Ke * V
19  end
20
21  @vars begin
22    conc = Central / V
23  end
24
25  @dynamics begin
26    Gut' = -Ka*Gut
27    Central' = Ka*Gut - Ke*Central
28  end
29
30  @derived begin
31    dv ~ @. Normal(conc,sqrt(conc^2 *Σ.diag[1] + Σ.diag[end])+eps())
32  end
33 end
```