**Simulation Plan**

**General Parameters**

Nsim = 100 for each combination

Tree Sizes = {20, 50, 100, 150}

**sig2**

No covariance =

Positive covariance =

Negative covariance =

**alpha and S parameters**

No covariance =

Positive Covariance =

Negative Covariance =

Singular Covariance =

**Pars value calculated through half-life to accommodate for different sized trees:**

Half-life(pars) = 1

Half-life(pars1) values = {0, 0.5, 1, 5}

pars2 = 0.5 \* pars1

pars21 = pars12 = 0.75 \* pars2

**R parameters**

DDexp and DDlin simulations are repeated twice for positive and negative slopes.

**Negative**

In negative simulations the three initial matrices at the root are the same as sig2.

Three variations for each sig2 tip value are the root rate divided by 2, 10 and 100 respectively.

The R term is created by finding the matrix needed to take the sig2 from the root value to the tip value over the simulation, accommodating for different sized trees.

**Positive**

In positive simulations the three initial matrices at the root are calculated by sig2 divided by 100.

Three variations for each sig2 tip value are the root rate multiplied by 10, 50 and 100 respectively.

The R term is created by finding the matrix needed to take the sig2 from the root value to the tip value over the simulation, accommodating for different sized trees.