Synchrony update: Part 2

Deirdre Loughnan

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Recent Progress

- Generated quantities block
- Adding a covariance matrix
- Testing my second research question

Generated quantities block

Method suggested by Geoff:

```
generated quantities {

real ypred_new[N];
for (i in 1:N)
    ypred_new[i] = normal_rng(mu_y[species[i]], sigma_y);
 }
```

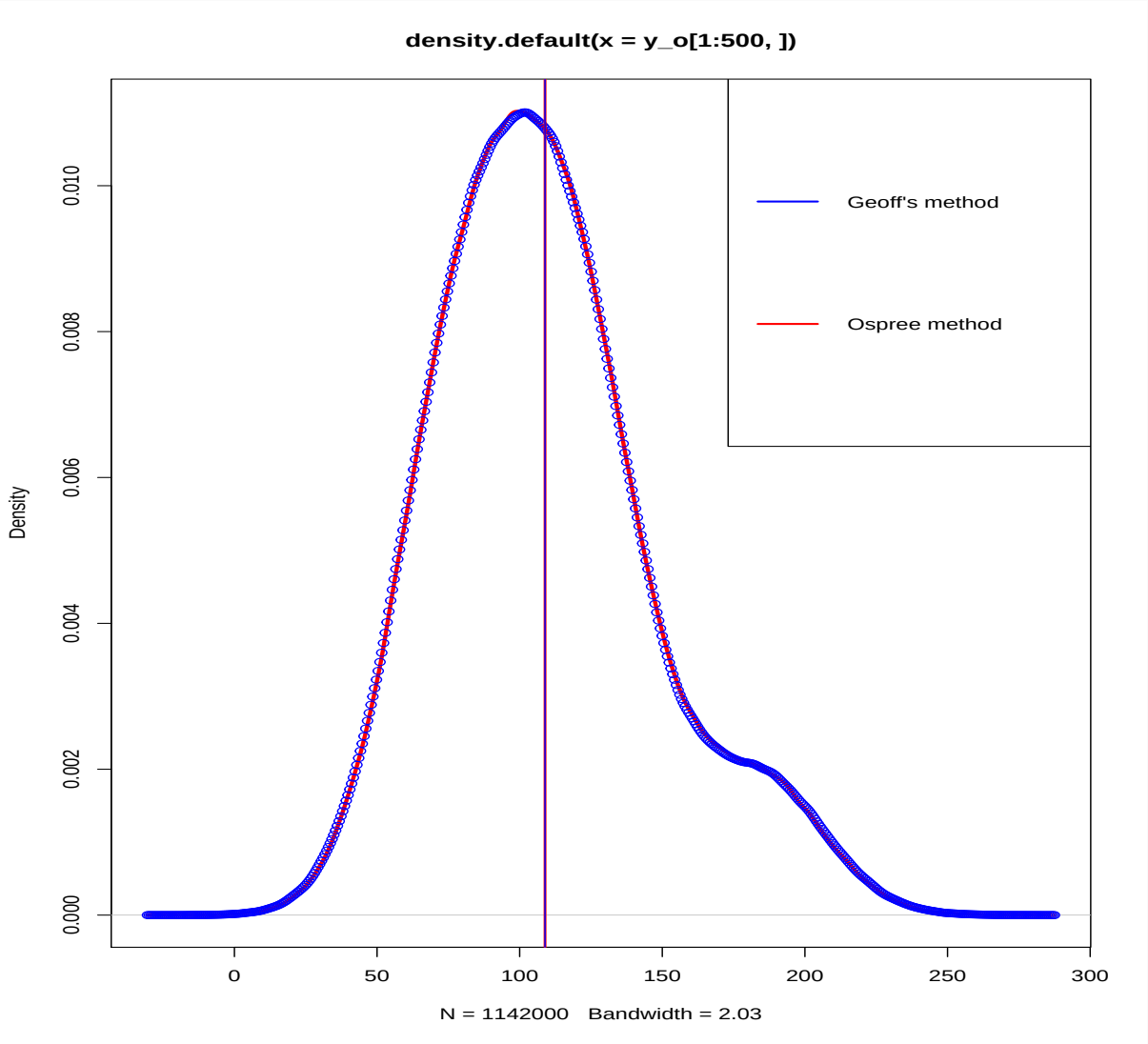
Method copied from Ospree model:

```
generated quantities {

real ypred_new[N];
for (i in 1:N)
ypred_new[i]=a+b[species[i]]*year[i];
for (i in 1:N)
ypred_new[i] = normal_rng(mu_y[species[i]], sigma_y);
}
```

Generated quantities block

They are equivalent!



Covariance matrix

See stan code:

Projects – Deirdre – Stan – singlesp_randslopes_goo_wcov

Covariance matrix model output

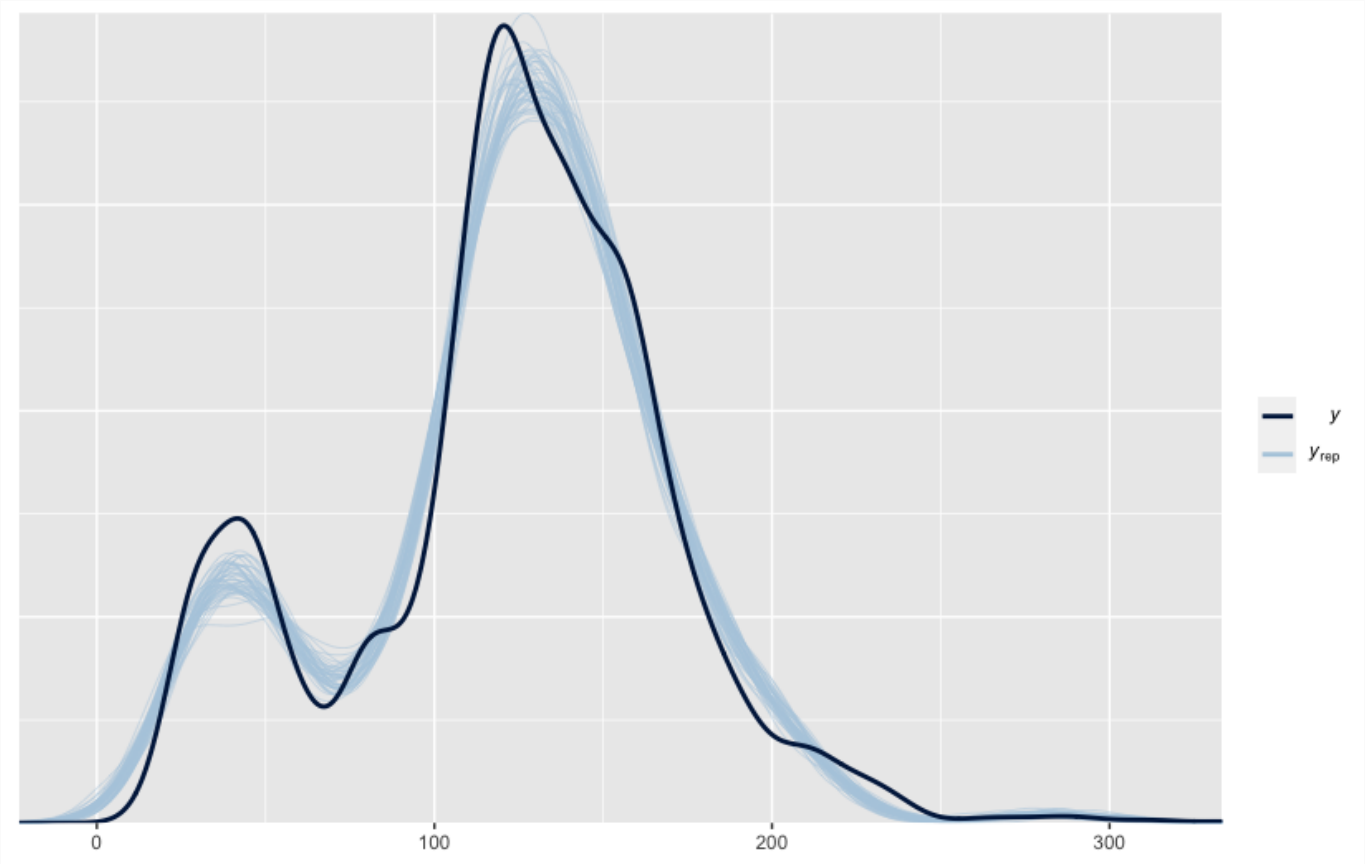
Model runs in a short amount of time and with no divergent transitions!

Printed model output:

	mean	se_mean	sd	2.5%	25%	50%	75%	97.5%	n_eff	Rhat
mu_b	-0.34	0.00	0.07	-0.48	-0.39	-0.34	-0.29	-0.20	6054	1
sigma_b	1.03	0.00	0.06	0.92	0.99	1.02	1.06	1.14	4523	1
sigma_y	22.10	0.00	0.14	21.84	22.01	22.10	22.19	22.38	20415	1
a[1]	203.34	0.12	11.13	181.86	195.74	203.35	210.82	225.31	9049	1
a[2]	171.90	0.08	9.54	153.09	165.56	171.93	178.52	190.26	15128	1
a[3]	81.38	0.07	6.25	68.98	77.20	81.40	85.58	93.33	7180	1

Covariance matrix model output

Model fit using all data except the Thackeray dataset:



Testing my second research question

Are the observed trends in shifts in interactions similar using data from single-species studies, or should we be using biologically relevant paired species data?

Testing my second research question

Using only the Kharouba (2018) data and *very* rough randomization: