

chapter 2

bayesian p values

$$pB = p(T_{\text{sim}} \leq T_{\text{obs}} \mid \tilde{Y})$$

Diagnostics

```
from scipy import stats
import numpy as np

good_chains = stats.beta.rvs(2, 5, size=(2, 2000))
bad_chains0 = np.random.normal(np.sort(good_chains, axis=None), 0.05,
                               size=4000).reshape(2, -1)

bad_chains1 = good_chains.copy()
for i in np.random.randint(1900, size=4):
    bad_chains1[i%2:, i:i+100] = np.random.beta(i, 950, size=100)

chains = {"good_chains": good_chains,
          "bad_chains0": bad_chains0,
          "bad_chains1": bad_chains1}
```

Effective sample size

```
import arviz as az

print(az.ess(chains))
```

```
<xarray.Dataset> Size: 24B
Dimensions:      ()
Data variables:
    bad_chains0  float64 8B 2.441
    bad_chains1  float64 8B 194.2
    good_chains  float64 8B 3.84e+03
```