The BUQEYE Cheatsheet for Pointwise Truncation Errors (arXiv:1904.10581)

From observable y, extract coefficients

$$\begin{aligned} \vec{y}_k &\equiv \{y_0, y_1, \cdots, y_k\} \\ \Rightarrow \vec{c}_k &\equiv \{c_0, c_1, \cdots, c_k\} \end{aligned} \tag{A1}$$

Choose ν_0 and τ_0. Update hyperparameters

$$\nu = \nu_0 + n_c \tag{A7}$$

$$\nu\tau^2 = \nu_0\tau_0^2 + \vec{c}_k^{\,2} \tag{A8}$$

Compute posterior

$$\mathrm{pr}(y \mid \vec{y}_k, Q) \sim t_\nu\left[y_k, y_{\mathrm{ref}}^2 \frac{Q^{2(k+1)}}{1-Q^2}\tau^2\right] \tag{A13}$$

```python
import numpy as np
y_ref = 20.0; Q = 0.3; k = 3
y_k = [21.7, 27.3, 25.4, 26.2]
c_k = np.array([y_k[0] / y_ref] + [
  (y_k[n] - y_k[n-1]) / (y_ref * Q**n)
  for n in range(1, k+1)])

nu_0 = 1; tau_0 = 1 # ~Uninformative
nu = nu_0 + len(c_k)
tau_sq = \
  (nu_0 * tau_0**2 + c_k @ c_k) / nu

from scipy.stats import t
scale = y_ref * Q**(k+1) * \
  ( tau_sq / (1 - Q**2) )**0.5
y = t(nu, y_k[-1], scale)
dob = y.interval(0.95) # (25.7, 26.7)
```