**Description**

Obtains samples from posterior distribution for the Exploratory reduced Reparameterized Unified Model (ErRUM).

**Usage**

```r
errum(
  y,
  k = 3,
  burnin = 1000,
  chain_length = 10000,
  verbose = FALSE,
  X = matrix(1, nrow = ncol(y)),
  v0 = 4,
  v1 = 2,
  cv0 = 0.1,
  cv1 = 10,
  bnu = 16
)
```

**Arguments**

- `y`: Binary responses to assessments in matrix form with dimensions $N \times J$.
- `k`: Number of Attribute Levels as a positive integer.
- `burnin`: Number of Observations to discard on the chain.
- `chain_length`: Length of the MCMC chain.
- `verbose`: Display estimation progress updates.
- `X`, `v0`, `v1`, `cv0`, `cv1`, `bnu`: Additional tuning parameters

**Value**

An `errum` object that has:

- `PISTAR`
- `RSTAR`
- `PIs`
- `QS`
- `m_Delta`
- `Delta_biject`
See Also

* simcdm::attribute_bijection(), simcdm::sim_rrum_items()*

Examples

```r
# Setup Simulation Parameters
N = 5
K = 3
J = 30
# Note:
# Sample size has been reduced to create a minimally
# viable example that can be run during CRAN's automatic check.
# Please make sure to have a larger sample size of around 3,000.

# Sample true attribute profiles
Z = matrix(rnorm(N * K), N, K)
Sig = matrix(.5, K, K)
diag(Sig) = 1
theta = Z %*% chol(Sig)

thvals = matrix(qnorm((1:K) / (K + 1)),
               N, K, byrow = TRUE)

Alphas = 1 * (theta > thvals)

# Defining matrix of possible attribute profiles
As = as.matrix(expand.grid(c(0, 1), c(0, 1), c(0, 1)))
Q = rbind(As[rep(c(2, 3, 5), 4),],
          As[rep(c(4, 6, 7), 4),],
          As[rep(8, 6),])

# Use simulation functions available in simcdm
if (requireNamespace("simcdm", quietly = TRUE)) {
  a = As %*% simcdm::attribute_bijection(K)
  As = As[a + 1,]

  # Setting item parameters
  pistar = rep(.9, J)
  rstar = matrix(.6, J, K) * Q

  # Simulate data under rRUM model
  Y = simcdm::sim_rrum_items(Q, rstar, pistar, Alphas)
}

# Estimation Settings
chainLength = 10000  # Run with 20000
burnin = chainLength / 2
```
# Gibbs Estimation

model = errum(Y, K, burnin, chainLength)

}
Index

errum, 2

simcdm::attribute_bijection(), 3
simcdm::sim_rrum_items(), 3