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import numpy as np

#
↳ https://stats.stackexchange.com/questions/120179/generating-data-with-a-given-sample-covariance-m
def gen_exact(mean=None, sigma=None, size=None, rng=None):
    if (mean is None or sigma is None or size is None or rng is None):
        return None
    # Generate size cases
    # rng = np.random.RandomState(seed)
    X = rng.multivariate_normal(mean, sigma, size=size).T

    # Subtract the mean from each variable
    for n in range(X.shape[0]):
        X[n] = X[n] - X[n].mean()

    # Make each variable in X orthogonal to one another
    L_inv = np.linalg.cholesky(np.cov(X, bias = True))
    L_inv = np.linalg.inv(L_inv)
    X = np.dot(L_inv, X)

    # Rescale X to exactly match Sigma
    L = np.linalg.cholesky(sigma)
    X = np.dot(L, X)

    # Add the mean back into each variable
    for n in range(X.shape[0]):
        X[n] = X[n] + mean[n]

    # The covariance of the generated data should match Sigma
    cov = np.cov(X, bias = True)
    X = X.T
    return X
```

```

def gen_inexact(mean=None, sigma=None, size=None, rng=None):
    if (mean is None or sigma is None or size is None or rng is None):
        return None
    # Generate size cases
    # rng = np.random.RandomState(seed)
    X = rng.multivariate_normal(mean, sigma, size=size).T

    # Make each variable in X orthogonal to one another
    L_inv = np.linalg.cholesky(np.cov(X, bias = True))
    L_inv = np.linalg.inv(L_inv)
    X = np.dot(L_inv, X)

    # Rescale X to exactly match Sigma
    L = np.linalg.cholesky(sigma)
    X = np.dot(L, X)

    # The covariance of the generated data should match Sigma
    cov = np.cov(X, bias = True)
    X = X.T
    return X

```