week4

August 30, 2024

[2]:

```
import numpy as np

def mul_regression():
    num_variables = int(input("Enter the number of independent variables: "))
    x_values = []

    for i in range(num_variables):
        x = input(f"Enter x{i+1} values (comma-separated): ")
        x_values.append([float(v) for v in x.split(',')])

    y_values = input("Enter y values (comma-separated): ")
    y = np.array([float(i) for i in y_values.split(',')])

    X = np.array(x_values).T
    X = np.c_[np.ones(X.shape[0]), X]

    XtX = np.dot(X.T, X)
    XtX_inv = np.linalg.inv(XtX)
    XtY = np.dot(X.T, y)
    beta = np.dot(XtX_inv, XtY)

    intercept = beta[0]
    coefficients = beta[1:]

    print(f"Intercept (b0): {intercept:.2f}")
    for i, coef in enumerate(coefficients, start=1):
        print(f"Coefficient for x{i} (b{i}): {coef:.2f}")

    equation = f"y = {intercept:.2f}"
    for i, coef in enumerate(coefficients, start=1):
        equation += f" + {coef:.2f}x{i}"

    print(f"Regression Equation: {equation}")
    return {'intercept': intercept, 'coefficients': coefficients, 'equation':␣
 ↪equation}

result = mul_regression()
```

```python
print(f"Intercept: {result['intercept']}")
print(f"Coefficients: {result['coefficients']}")
print(f"Equation: {result['equation']}")
```

```
Intercept (b0): 1.96
Coefficient for x1 (b1): 2.60
Regression Equation: y = 1.96 + 2.60x1
Intercept: 1.9584569732938064
Coefficients: [2.59643917]
Equation: y = 1.96 + 2.60x1
```