```python
    print("terminal_list: ", terminal_list)

    print("input shape is ", input.shape)

    vars = []
    for j in range(input.shape[1]):
        cur_vars = {'x'+str(i): input[i][j] for i in
range(input.shape[0])}
        # print("cur_vars is ", cur_vars)
        vars.append(cur_vars)
    vars = np.array(vars)

    print("vars shape is ", vars.shape)

    # Plot the distribution of the labels as a histogram
    plt.figure(figsize=(10, 6))
    plt.hist(labels, bins=30, alpha=0.7, edgecolor='black')
    plt.title(f'Distribution of Labels for Problem {problem_number}')
    plt.xlabel('Label Value')
    plt.ylabel('Frequency')
    plt.grid(True)
    plt.show()

    # Plot the distribution of the labels as a hexbin plot
    plt.figure(figsize=(10, 6))
    plt.hexbin(labels, np.zeros_like(labels), gridsize=50,
cmap='viridis', mincnt=1)
    plt.colorbar(label='Counts')
    plt.title(f'Density of Labels for Problem {problem_number}')
    plt.xlabel('Label Value')
    plt.yticks([])  # Hide y-axis ticks
    plt.grid(True)
    plt.show()
```
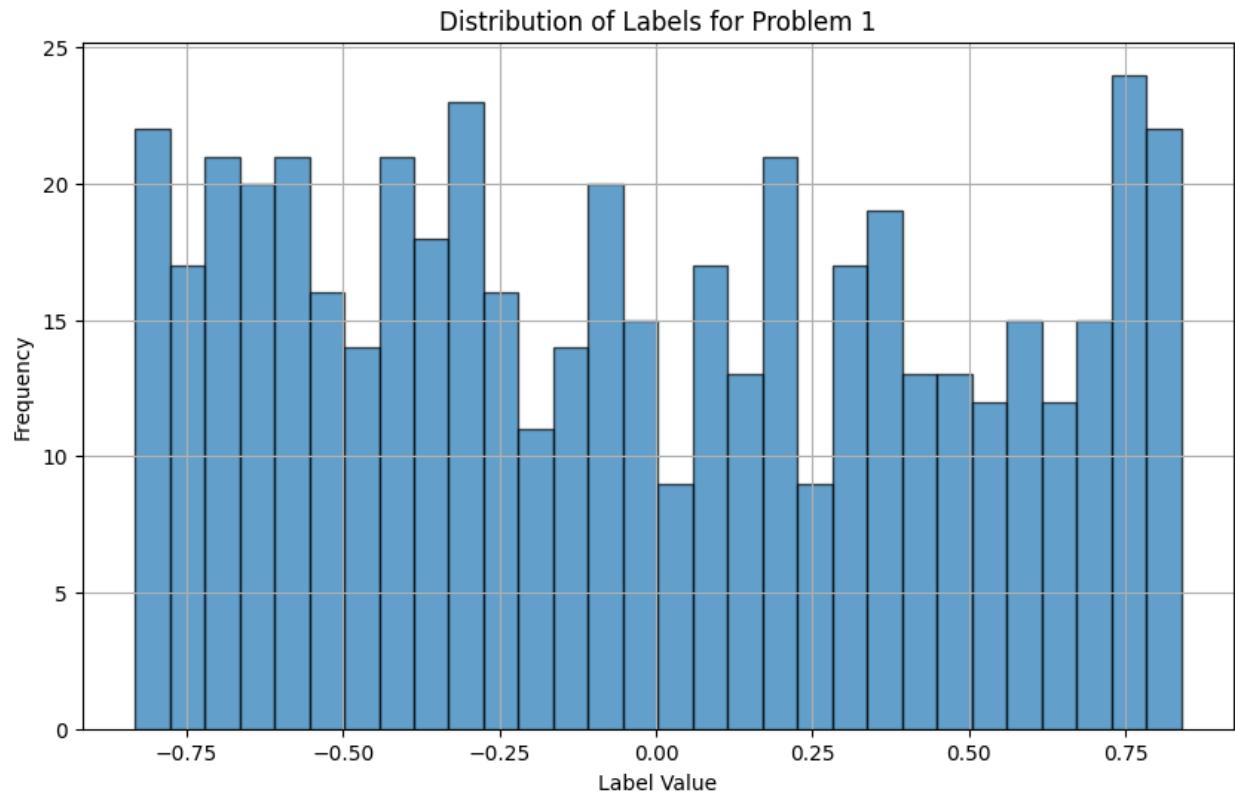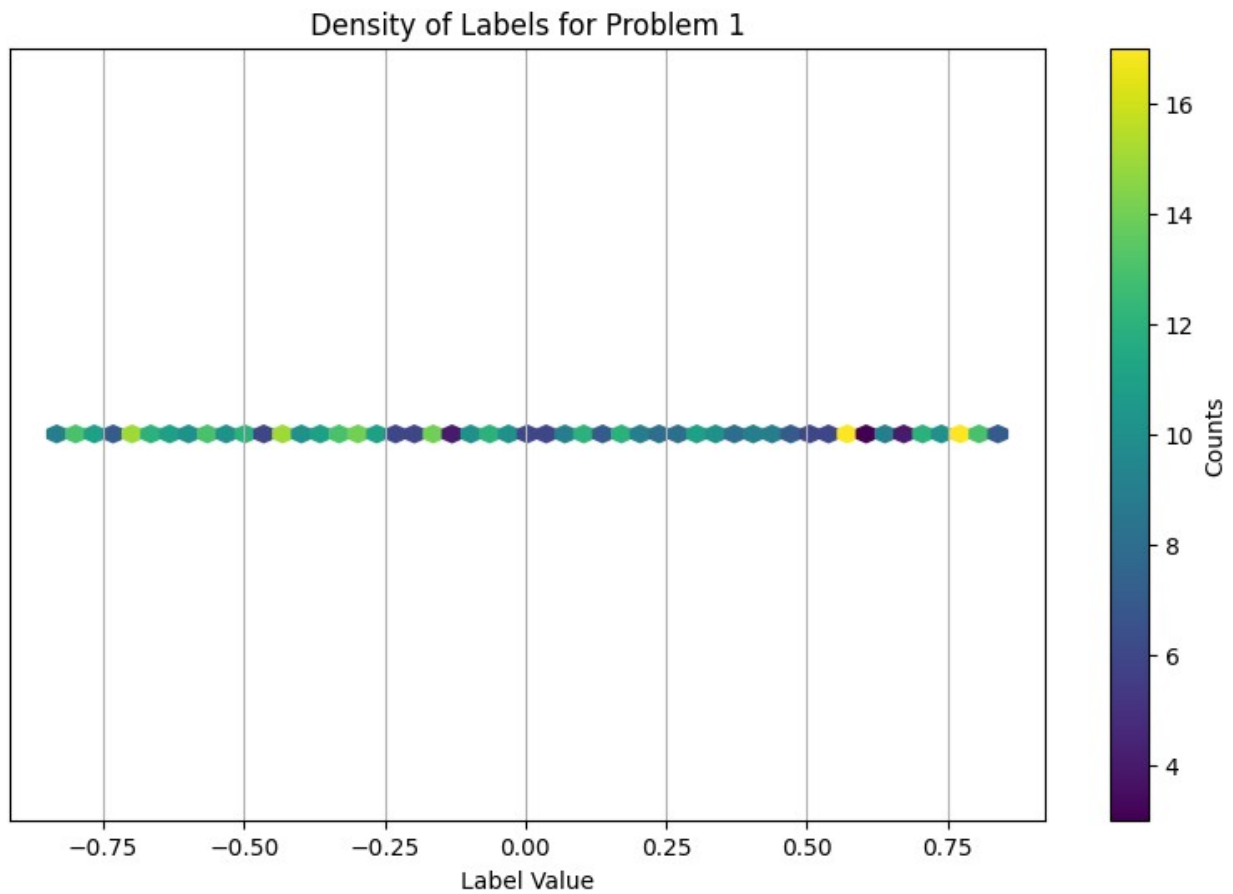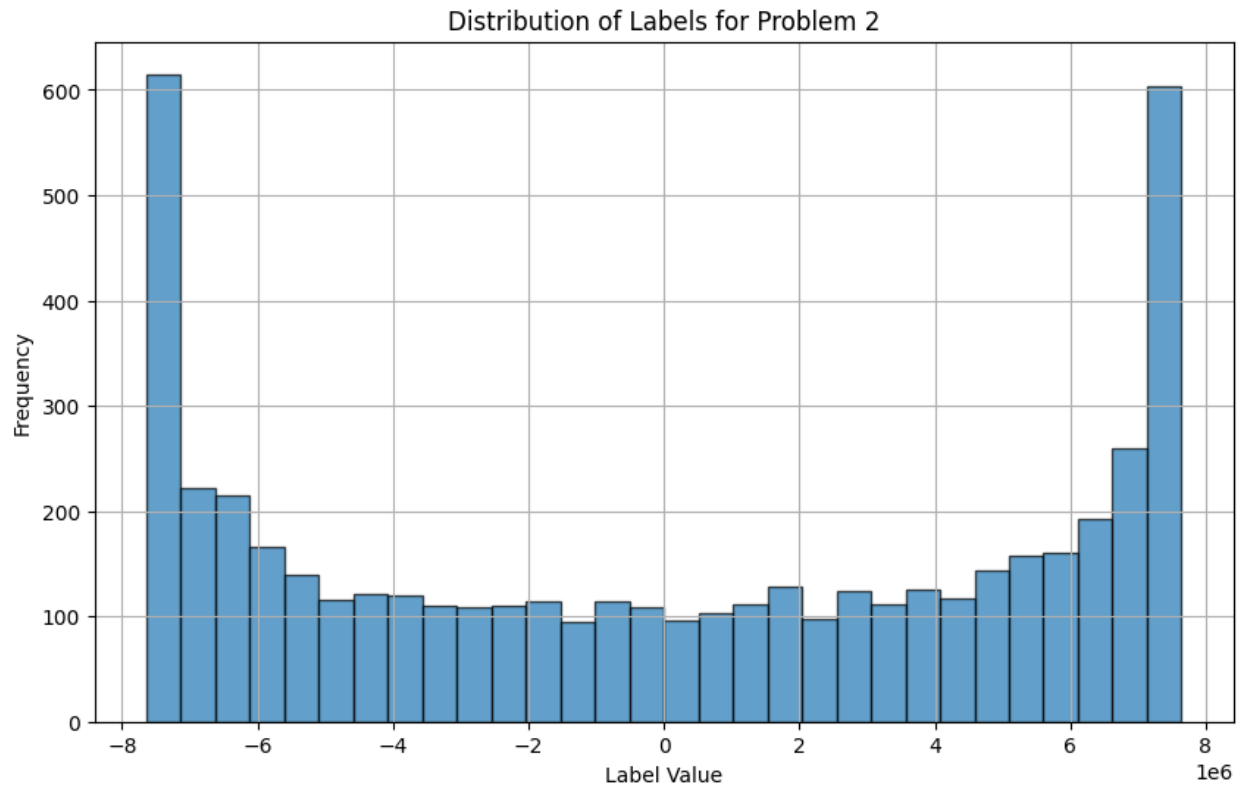
```
====================================
Problem number:  1
Input shape: (1, 500)  Example of sample:  [0.87494382]
Labels shape: (500,)  Example of label:  0.767507490669687
terminal_list:  ['x0']
input shape is  (1, 500)
vars shape is  (500,)
```
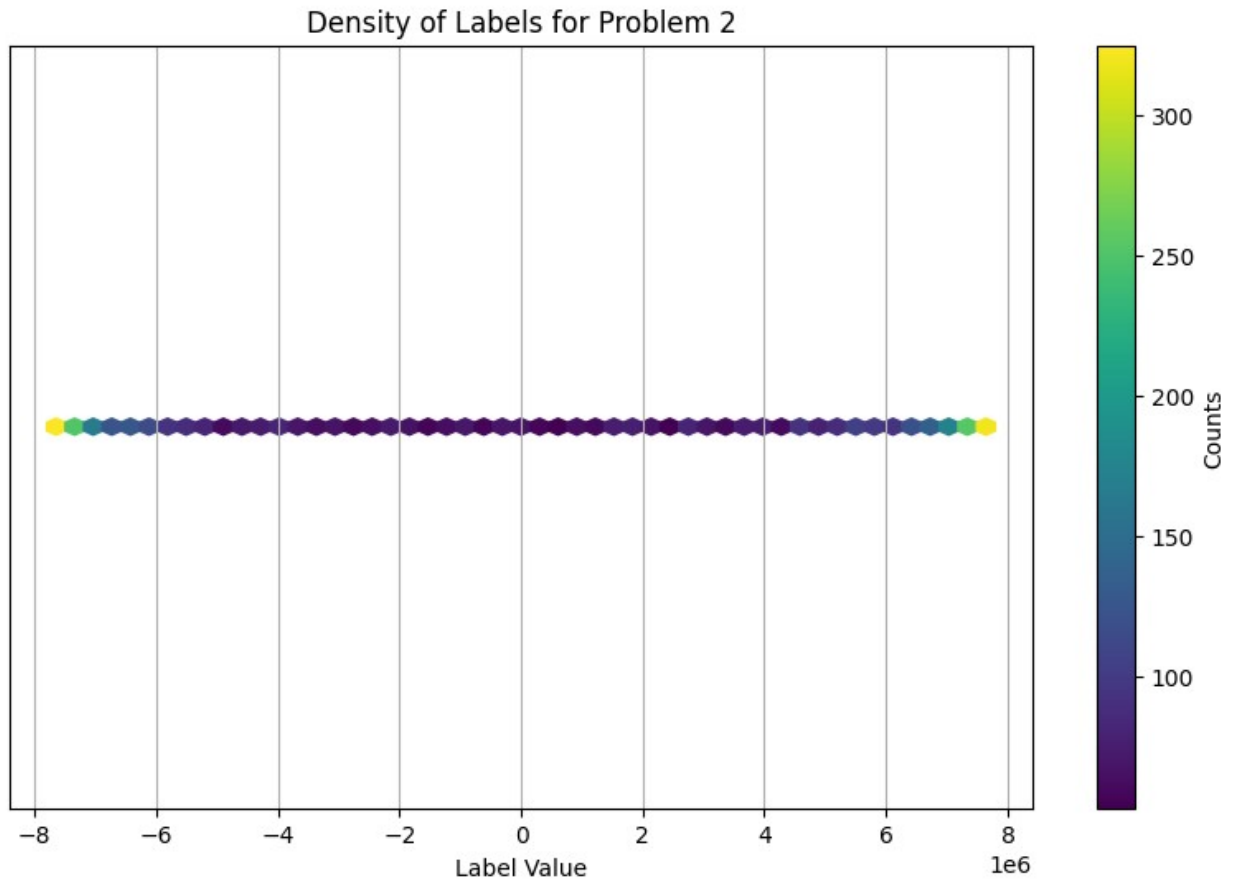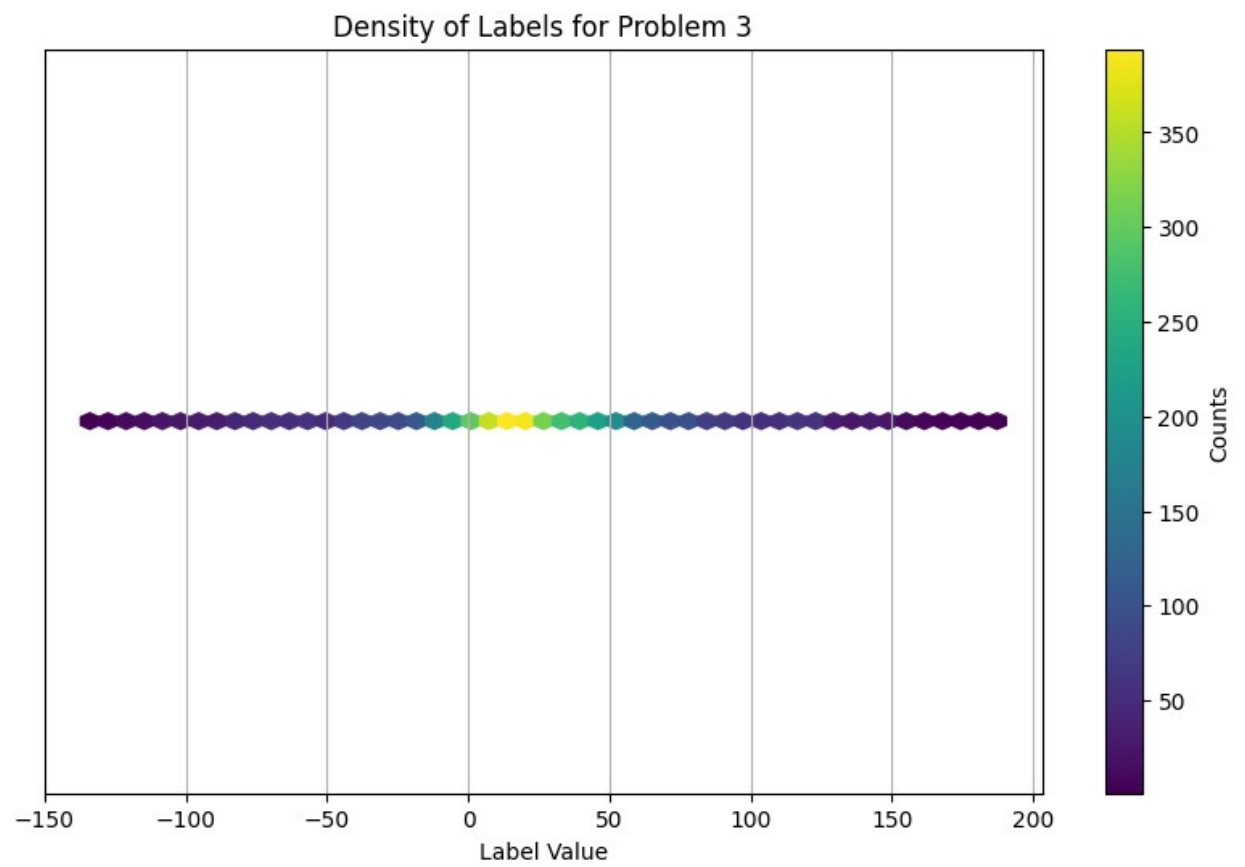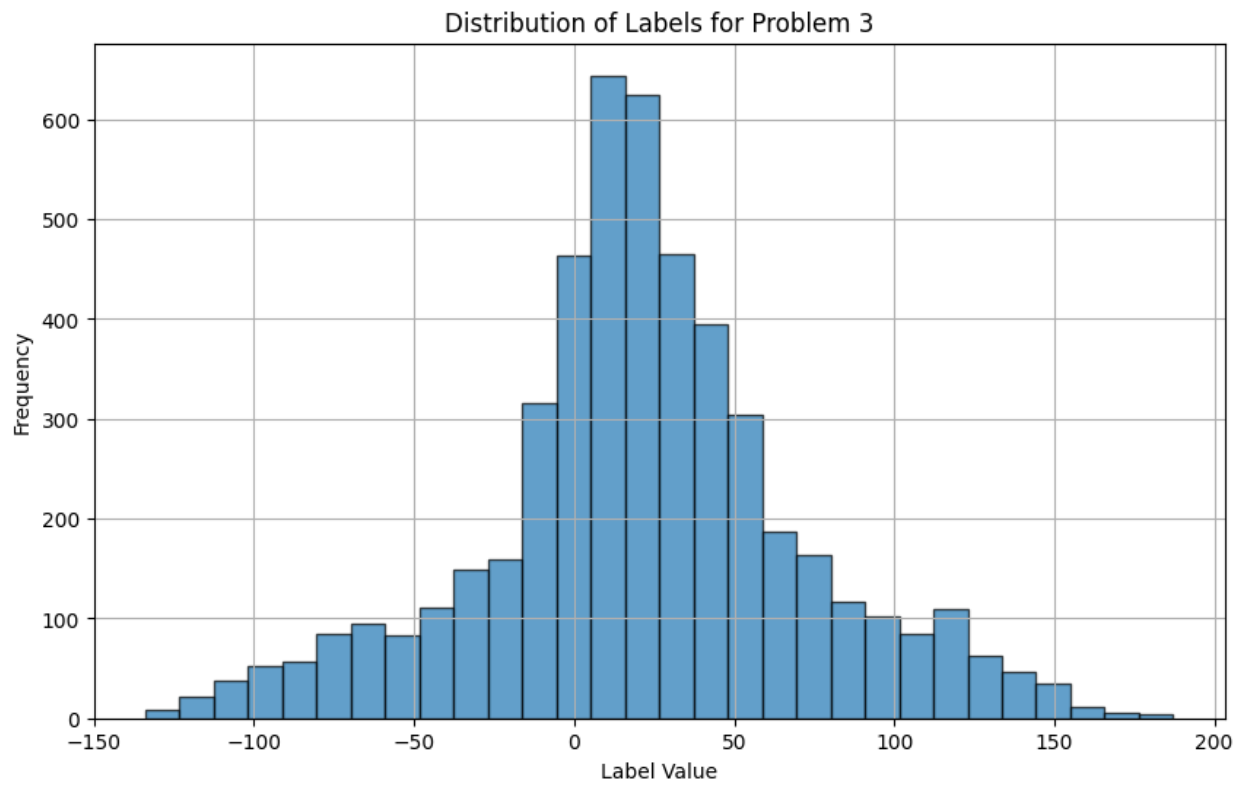
Distribution of Labels for Problem 1

Density of Labels for Problem 1

```
====================================
Problem number:  2
Input shape: (3, 5000)  Example of sample:  [ 4.52991777 -0.18656382 -
1.60071107]
Labels shape: (5000,)  Example of label:  7410414.436905311
terminal_list:  ['x0', 'x1', 'x2']
input shape is  (3, 5000)
vars shape is  (5000,)
```
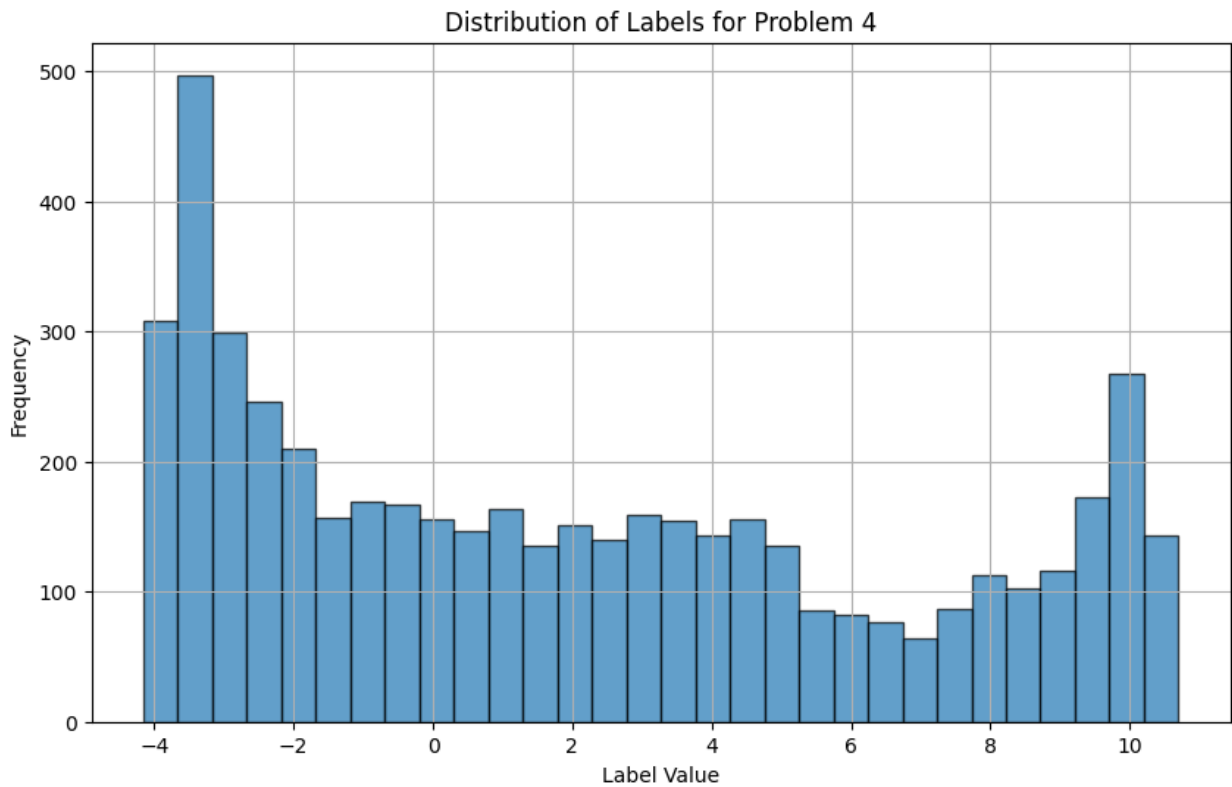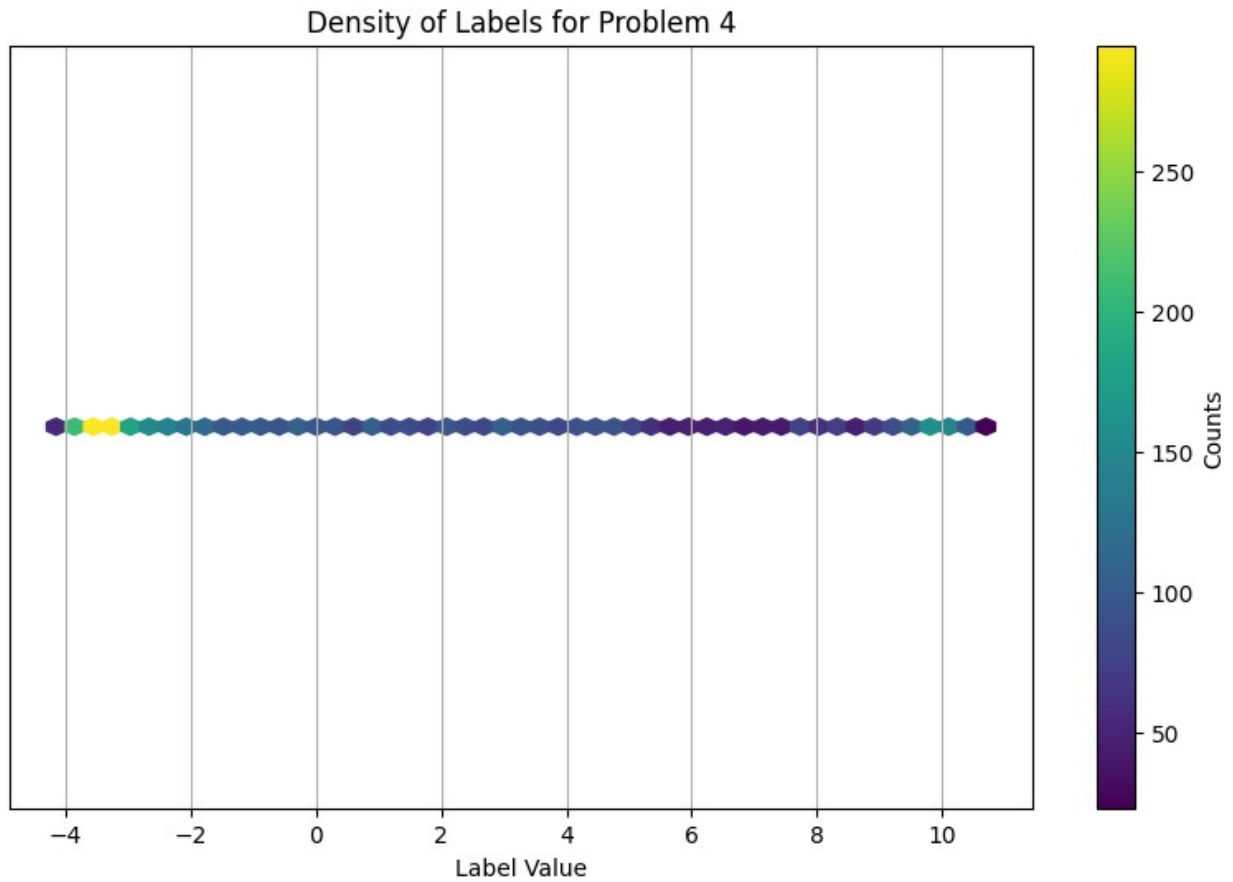
Distribution of Labels for Problem 2

Density of Labels for Problem 2

```
========================================
Problem number:  3
Input shape: (3, 5000)  Example of sample:  [ 1.52827812 -2.67876092 -
3.73351453]
Labels shape: (5000,)  Example of label:  40.96071445158248
terminal_list:  ['x0', 'x1', 'x2']
input shape is  (3, 5000)
vars shape is  (5000,)
```
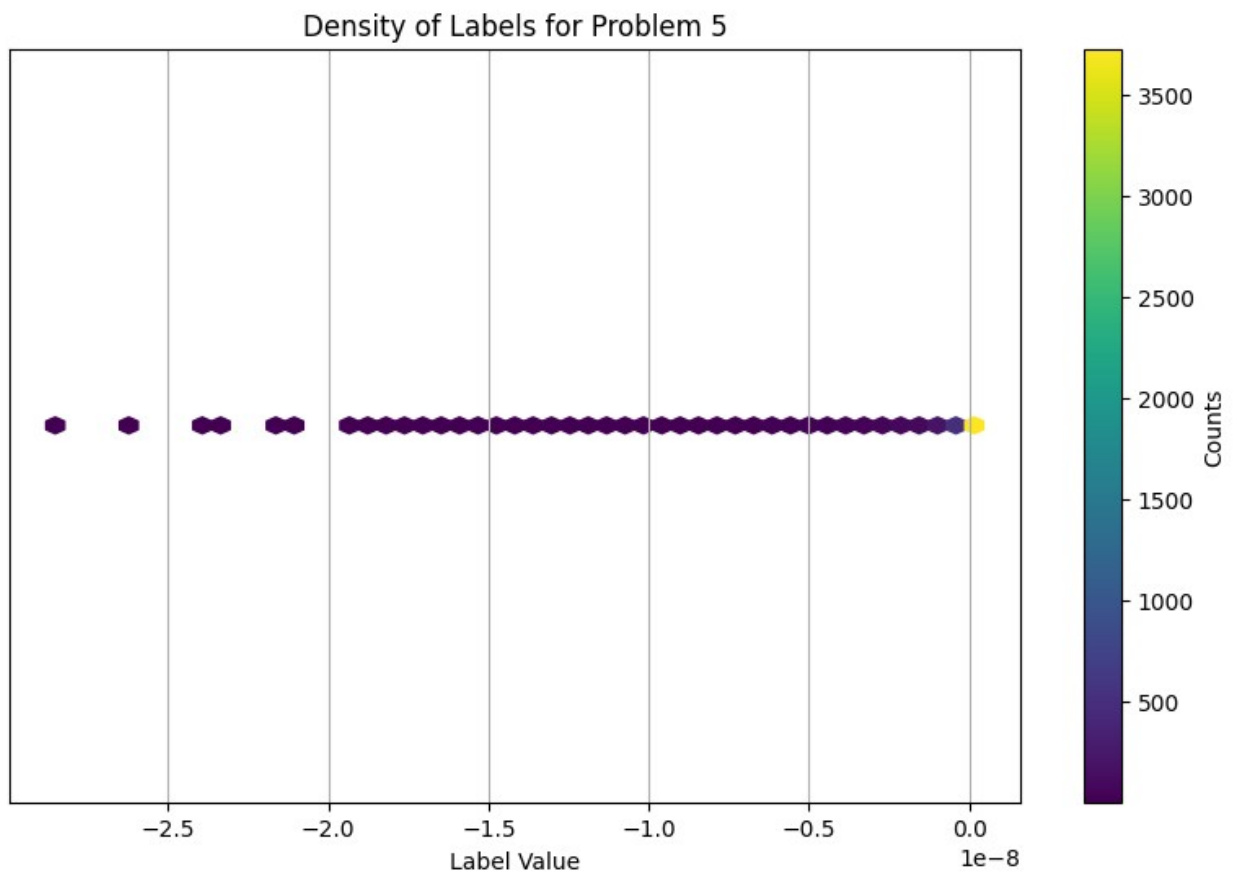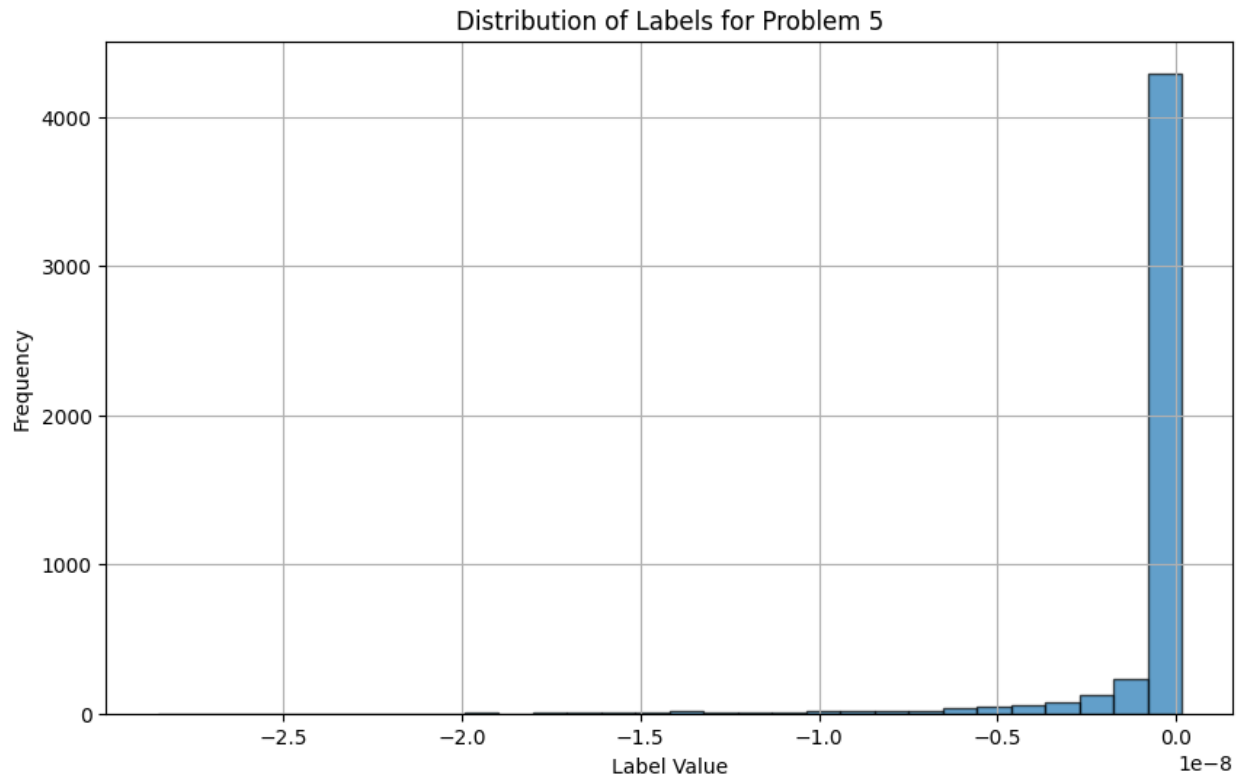
Distribution of Labels for Problem 3

Density of Labels for Problem 3

```
========================================
Problem number:  4
Input shape: (2, 5000)  Example of sample:  [ 3.15087424 -1.73013313]
Labels shape: (5000,)  Example of label:  1.8823292724754674
terminal_list:  ['x0', 'x1']
input shape is  (2, 5000)
vars shape is  (5000,)
```
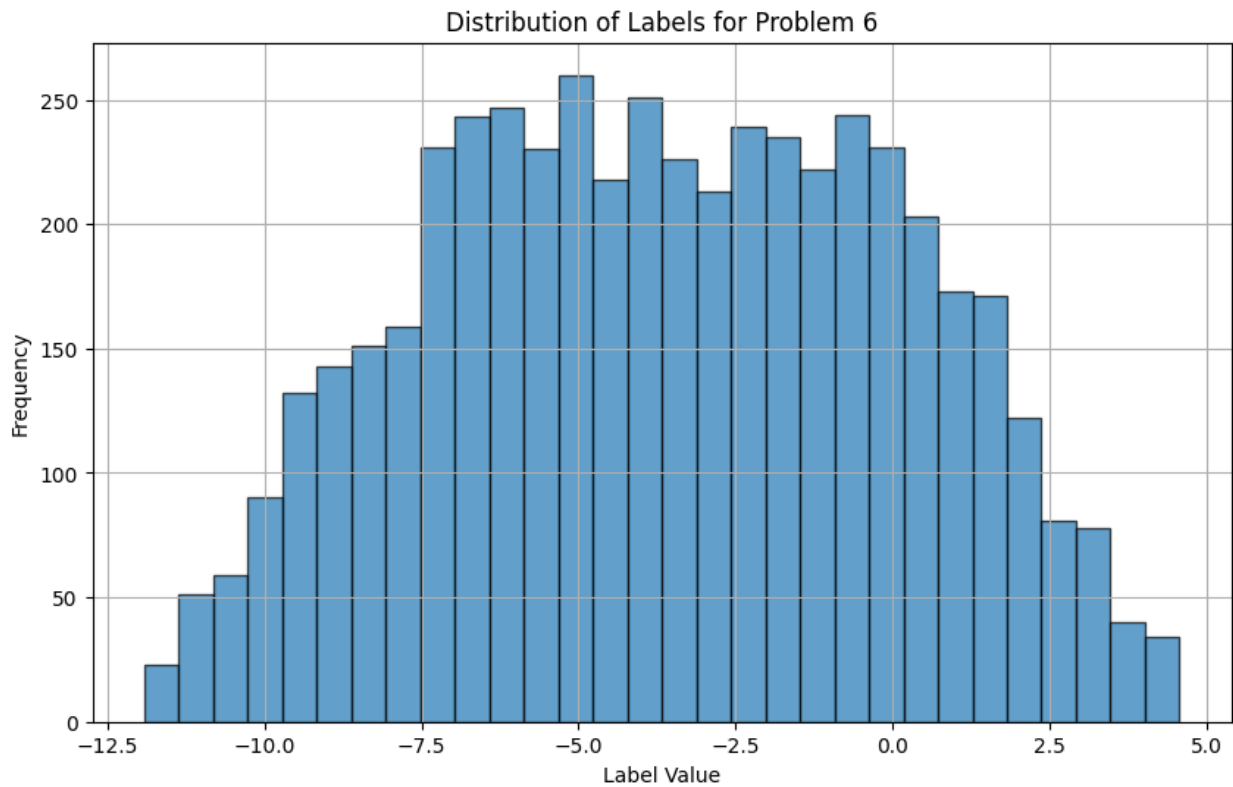
Distribution of Labels for Problem 4

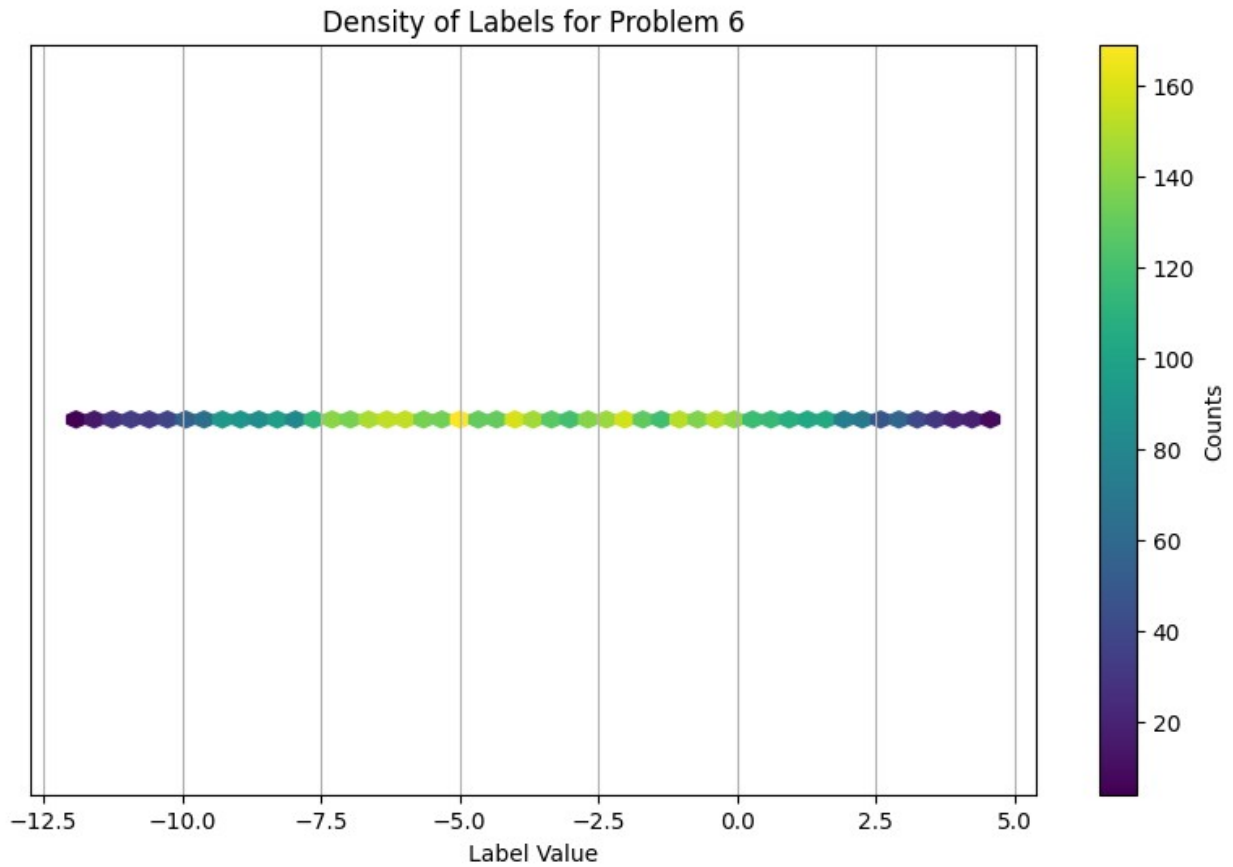Density of Labels for Problem 4

```
========================================
Problem number:  5
Input shape: (2, 5000)  Example of sample:  [0.47539734 4.04724856]
Labels shape: (5000,)  Example of label:  1.6192929113321065e-10
terminal_list:  ['x0', 'x1']
input shape is  (2, 5000)
vars shape is   (5000,)
```
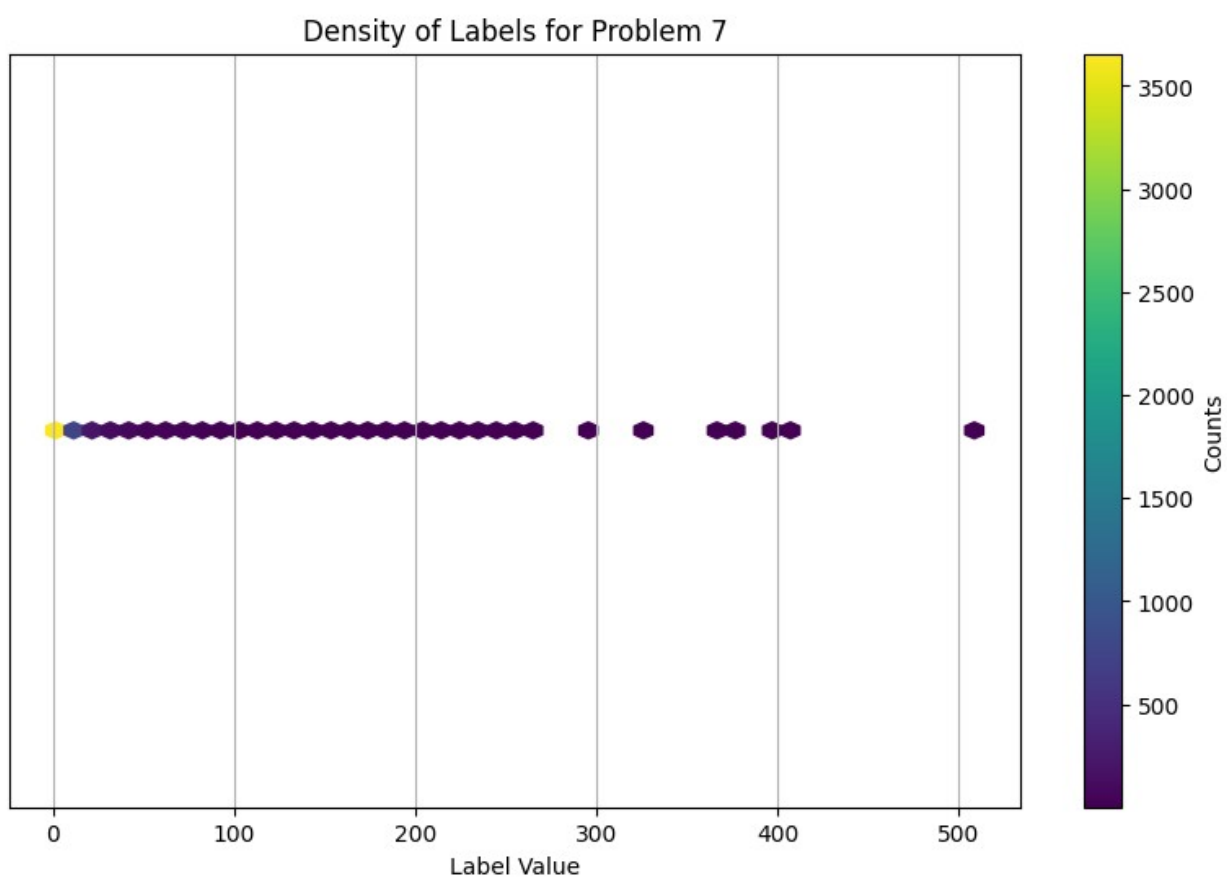
Distribution of Labels for Problem 5

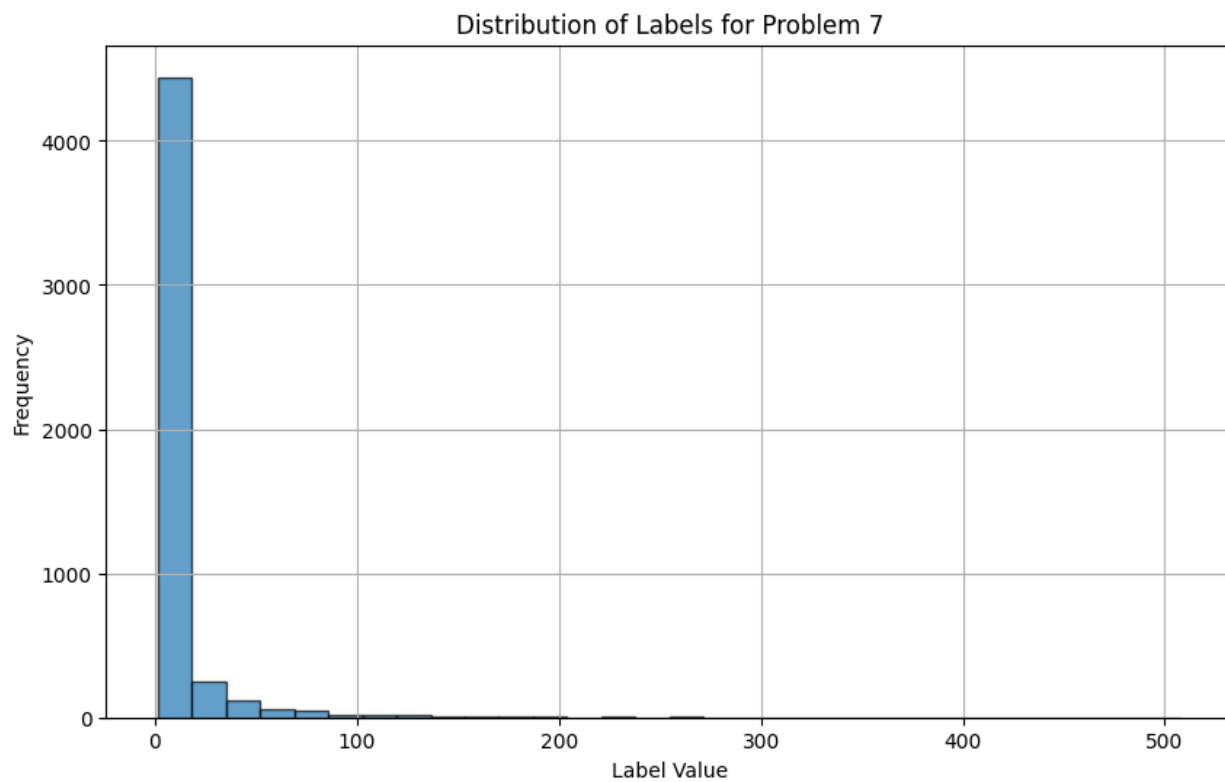Density of Labels for Problem 5

```
========================================
Problem number:  6
Input shape: (2, 5000)  Example of sample:  [ 1.00178758 -1.98101753]
Labels shape: (5000,)  Example of label:  -4.052636527634054
terminal_list:  ['x0', 'x1']
input shape is  (2, 5000)
vars shape is  (5000,)
```

Distribution of Labels for Problem 6

Density of Labels for Problem 6

```
========================================
Problem number:  7
Input shape: (2, 5000)  Example of sample:  [0.19267392 1.98111504]
Labels shape: (5000,)  Example of label:  4.886874543831234
terminal_list:  ['x0', 'x1']
input shape is  (2, 5000)
vars shape is  (5000,)
```

Distribution of Labels for Problem 7

Density of Labels for Problem 7

```
=====================================
Problem number:  8
Input shape: (6, 50000)  Example of sample:  [-3.0855975  -3.93221086
 -3.47850254  4.3036516   3.71133209 -3.5473932 ]
Labels shape: (50000,)  Example of label:  -3362.5447994306087
terminal_list:  ['x0', 'x1', 'x2', 'x3', 'x4', 'x5']
input shape is  (6, 50000)
vars shape is  (50000,)
```


Distribution of Labels for Problem 8

Density of Labels for Problem 8