

Xu_Weijie_HW3

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1 Conceptual Exercises

1.1 Task 1, 2

```
[1]: import numpy as np
import pandas as pd
import random
import math
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import RidgeCV
from sklearn.linear_model import LassoCV
from sklearn.linear_model import ElasticNetCV
from sklearn.metrics import mean_squared_error
```

```
[2]: SEED = 970608
```

```
[3]: np.random.seed(SEED)
X = []
for x in range(20):
    x = np.random.normal(0, 1, 1000)
    X.append(x)
X = np.stack(X, axis=-1)
beta = np.array([1, 2, 0, 5, 0, 6, 2, 0, 1, 7, 0, 4, 2, 0, 0, 5, 3, 0, 0, 1])
y = np.dot(X, beta) + np.random.normal(0, 1, 1000)
```

```
[4]: X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.9,
    ↪train_size=0.1)
```

```
[5]: def fit_linear_model(X_train, X_test, y_train, y_test):
    lm = LinearRegression()
    lm.fit(X_train, y_train)
```

```

mse_train = mean_squared_error(y_train,lm.predict(X_train))
mse_test = mean_squared_error(y_test,lm.predict(X_test))
coeffs = lm.coef_
return mse_train, mse_test, coeffs

```

```

[6]: def run_subset_selection(X_train, X_test, y_train, y_test):
    remaining_cols = list(range(20))
    selected_cols = []
    subset_selection = {}
    for k in range(1, 21):
        k_dict = {}
        best_mse_train = None
        for col in remaining_cols:
            temp_X_train = X_train[:, selected_cols + [col]]
            temp_X_test = X_test[:, selected_cols + [col]]
            mse_train, mse_test, coeffs = fit_linear_model(temp_X_train,
↪temp_X_test, y_train, y_test)
            if best_mse_train == None:
                best_mse_train, best_mse_test, best_col, best_coeffs =
↪mse_train, mse_test, col, coeffs
            elif mse_train < best_mse_train:
                best_mse_train, best_mse_test, best_col, best_coeffs =
↪mse_train, mse_test, col, coeffs
            selected_cols.append(best_col)
            k_dict['mse_train'], k_dict['mse_test'] = best_mse_train, best_mse_test
            k_dict['coeffs'], k_dict['coeffs_id'] = best_coeffs, selected_cols.
↪copy()
            subset_selection[k] = k_dict
    return subset_selection

```

1.2 Task 3, 4, 5, 6

As for the training set, the model lands on its minimum MSE when the number of features is around 11, with very limited decrease of MSE for larger model size. As for the test set, the model starts to take on its minimum MSE value when the model size is around 12. Furthermore, the best model size that is the first to take on the minimum MSE of test data is very close to the true model used to generate data, which means that the subset selection is quite effective.

```

[7]: # Run subset selection
subset_selection = run_subset_selection(X_train, X_test, y_train, y_test)

```

```

[8]: # Plot MSE associated with the best model of each size

num_features = list(range(1, 21))
mse_train_list = [k_dict['mse_train'] for k_dict in subset_selection.values()]
mse_test_list = [k_dict['mse_test'] for k_dict in subset_selection.values()]

```

```

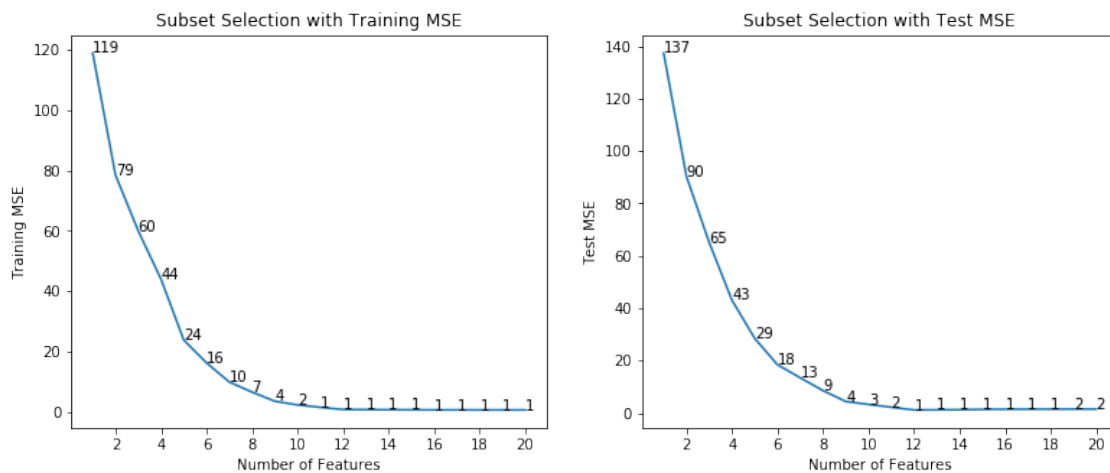
fig = plt.figure(figsize = (13,5))

ax = fig.add_subplot(1, 2, 1)
ax.plot(num_features, mse_train_list)
ax.set_xlabel('Number of Features')
ax.set_ylabel('Training MSE')
ax.set_xticks(list(range(2, 21, 2)))
ax.set_title('Subset Selection with Training MSE')
for a,b in zip(num_features, mse_train_list):
    plt.text(a, b+0.05, '%.0f' % b)

ax = fig.add_subplot(1, 2, 2)
ax.plot(num_features, mse_test_list)
ax.set_xlabel('Number of Features')
ax.set_ylabel('Test MSE')
ax.set_xticks(list(range(2, 21, 2)))
ax.set_title('Subset Selection with Test MSE')
for a,b in zip(num_features, mse_test_list):
    plt.text(a, b+0.05, '%.0f' % b)

plt.show()

```



1.3 Task 7

The coefficient estimate error of the model decreases at the beginning when the model size increases and lands on its minimum when the number of features is 12. When the model size further increases, the coefficient error will then increase in turn. The result of the best model size based on the coefficient estimate error is the same as the result based on test MSE.

```
[9]: # Plot coefficient estimate error.
```

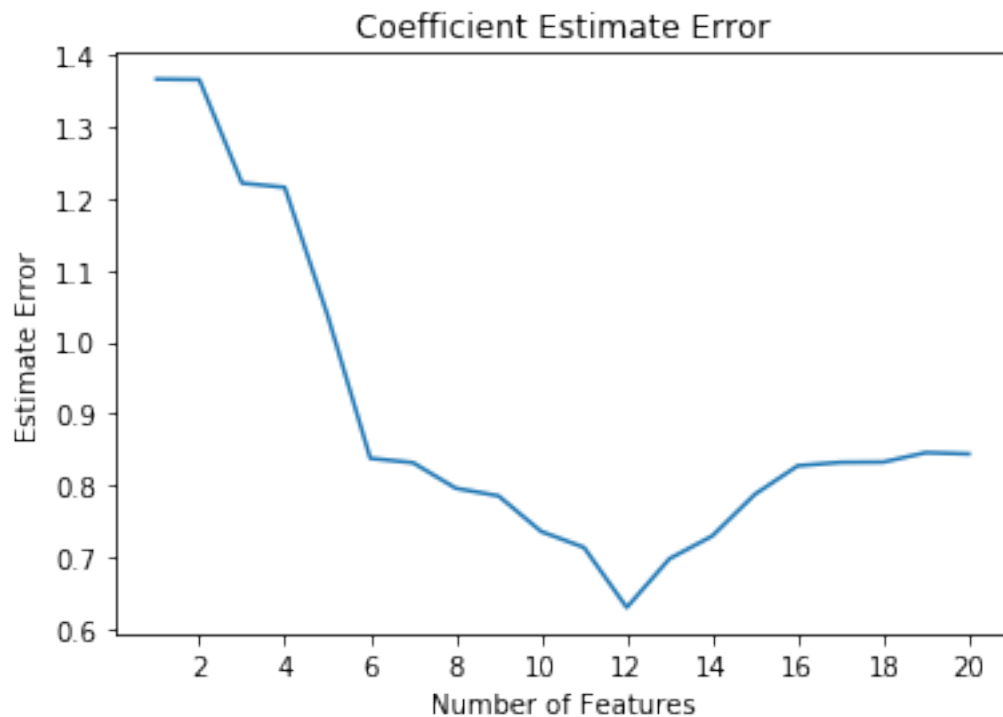
```

errs = []
for k in range(1, 21):
    simulated_coeffs = subset_selection[k]['coeffs']
    true_coeffs = beta[subset_selection[k]['coeffs_id']]
    err_k = math.sqrt(sum((simulated_coeffs - true_coeffs) ** 2))
    errs.append(math.sqrt(err_k))

plt.plot(num_features, errs)
plt.xlabel('Number of Features')
plt.ylabel('Estimate Error')
plt.xticks(list(range(2, 21, 2)))
plt.title('Coefficient Estimate Error')

plt.show()

```



2 Application Exercises

Task 1:

The test MSE for the least squares linear model is 65.91

Task 2:

The test MSE of ridge regression is 62.5

Task 3:

The test MSE of lasso regression is 62.78. And the number of non-zero coefficient estimates is 24

Task 4:

The best combination of alpha and lambda for the elastic net model is 1 and 0.1, which is a lasso regression. For this combination, the test MSE is 62.78, and the number of non-zero coefficients is 24.

Task 5:

According to the test MSE, the accuracy of our models, no matter which one, is very limited. The test errors resulting from ridge regression, lasso regression, and elastic net are quite similar with limited difference. The test error of the least squared linear model is a bit higher than other models, which means that the performance of the least square linear model is a little bit worse than others.

2.1 Task 1

```
[10]: df_train = pd.read_csv('data/gss_train.csv')
      df_test = pd.read_csv('data/gss_test.csv')

[11]: X_train, y_train = df_train.drop('egalit_scale', axis=1),
      ↪df_train['egalit_scale']
      X_test, y_test = df_test.drop('egalit_scale', axis=1), df_test['egalit_scale']

[12]: mse_test_least_sq = fit_linear_model(X_train, X_test, y_train, y_test)[1]
      print('MSE of least square: {}'.format(mse_test_least_sq))
```

MSE of least square: 63.213629623014995

2.2 Task 2

The test MSE of ridge regression is 62.5

```
[13]: lm_ridge = RidgeCV(cv=10)
      lm_ridge.fit(X_train, y_train)
      mse_test_ridge = mean_squared_error(y_test, lm_ridge.predict(X_test))
      print('MSE of ridge: {}'.format(mse_test_ridge))
```

MSE of ridge: 62.49920243957809

2.3 Task 3

The test MSE of lasso regression is 62.78. And the number of non-zero coefficient estimates is 24

```
[14]: lm_lasso = LassoCV(cv=10)
      lm_lasso.fit(X_train, y_train)
      mse_test_lasso = mean_squared_error(y_test, lm_lasso.predict(X_test))
      non_zeros_lasso = np.count_nonzero(lm_lasso.coef_)

[15]: print('MSE of lasso: {}'.format(mse_test_lasso))
      print('Number of non-zero coefficients: {}'.format(non_zeros_lasso))
```

MSE of lasso: 62.7780157899344

Number of non-zero coefficients: 24

2.4 Task 4

The best combination of alpha and lambda is 1 and 0.1, which is a lasso regression. For this combination, the test MSE is 62.78, and the number of non-zero coefficients is 24.

```
[16]: cv_list = [0, .1, .2, .3, .4, .5, .6, .7, .8, .9, 1]
lm_elastic = ElasticNetCV(l1_ratio=cv_list, alphas=cv_list, cv=10)
lm_elastic.fit(X_train, y_train)
mse_test_elastic = mean_squared_error(y_test, lm_elastic.predict(X_test))
non_zeros_elastic = np.count_nonzero(lm_elastic.coef_)
```

```
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46070.60730221004, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45686.31123851805, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45265.60715033991, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44800.80995079386, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
```

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44281.18238840162, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43690.94265936533, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43005.302990744625, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42181.649061259435, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41136.416788438175, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 39665.3972836462, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.798962216766, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46388.81788509128, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46001.68505385365, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45577.07738881578, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 45106.922666156745, tolerance: 12.501906826706676
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44579.897832832714, tolerance: 12.501906826706676
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43979.29030552845, tolerance: 12.501906826706676
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43278.732300417665, tolerance: 12.501906826706676
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
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  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42432.65913796098, tolerance: 12.501906826706676
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41351.10329796777, tolerance: 12.501906826706676
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
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    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 39811.54926880452, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.57130095483, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45847.16414334598, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45466.18739464188, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45048.889510918474, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

```

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44587.50000491206, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44071.14056398308, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43483.80455867224, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42800.36347825122, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41977.754544965566, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 40932.20376435879, tolerance: 12.28351822955739
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 39462.70380339863, tolerance: 12.28351822955739
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.592109299236, tolerance: 12.28351822955739
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46467.28690480674, tolerance: 12.346995798949736
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46082.45428945513, tolerance: 12.346995798949736
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45660.05303522697, tolerance: 12.346995798949736
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

```

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45191.9642775439, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44666.80008448339, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44067.76233563622, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43368.388303815314, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42523.081080321055, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41442.239075879195, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 39905.60221644685, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489193, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46458.82488232576, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46089.21222139352, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 45683.386899327226, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45233.40911045424, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44728.114658758495, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44150.99325939282, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43475.963575561866, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42657.94337663511, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41608.01158203372, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 40106.92649546445, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.45386687039, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44815.88740600709, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44415.46375278162, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43975.606992066256, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43487.7126571119, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42939.68566493831, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42313.642696236515, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41581.34152979451, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 40694.00894518924, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 39555.728706551585, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37932.19982261945, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.256671758536, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45803.66641942234, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45416.152983342894, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44991.91888561277, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44523.16634091774, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43998.97083919477, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43403.21686457917, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42710.46450274557, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41876.65191041551, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 40814.33086370902, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 39304.79047018684, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.447100048725, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46044.607051097686, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 45678.29943569836, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45276.46034409653, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44831.351443332365, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44332.08186995664, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43762.51926054527, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43097.11502421013, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42291.546105705485, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41257.91684652529, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 39777.324611630946, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.011606799875, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46405.623962209436, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46023.35546475477, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45605.01394446746, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45143.03818031499, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44626.87946434114, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44041.0621886718, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 43361.340104278395, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42546.170019665275, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41514.44191785566, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 40068.72001746603, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.410690795645, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46756.10805550678, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 46359.205397565274, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45924.69675320618, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 45444.60878678623, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44907.77660848563, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 44297.74498007413, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 43588.577616975104, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 42735.46379855002, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 41649.8039002885, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 40111.25925150694, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476496, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 36707.798962216824, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.57130095471, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.59210929924, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489196, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.45386687041, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.256671758514, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.44710004884, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.01160679989, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.41069079557, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476498, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.79896221647, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.571300954696, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.59210929921, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489202, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.45386687043, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.256671758616, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 36066.44710004875, tolerance: 12.300672318079519
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.011606799904, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.41069079557, tolerance: 12.340121830457614
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476494, tolerance: 12.506681020255064
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.798962216584, tolerance: 12.395240465465465
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.571300954754, tolerance: 12.501906826706676
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.59210929921, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489193, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.45386687042, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.25667175863, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.44710004877, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.01160679988, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.41069079558, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476497, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.79896221667, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.571300954674, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 36657.59210929923, tolerance: 12.28351822955739
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489194, tolerance: 12.346995798949736
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.453866870346, tolerance: 12.41885041260315
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.256671758514, tolerance: 12.047380195048763
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.44710004876, tolerance: 12.300672318079519
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.01160679986, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.410690795536, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476495, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.79896221667, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.571300954725, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.592109299214, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489199, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.45386687039, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.25667175863, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.447100048885, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.01160679988, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 37142.410690795616, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.249764765, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.79896221665, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.57130095467, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.59210929919, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.870584892065, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.453866870375, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.256671758594, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.447100048696, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.01160679992, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.41069079556, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476487, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.79896221706, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.57130095471, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.592109299294, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489203, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

```

```

Duality gap: 36977.45386687048, tolerance: 12.41885041260315
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.25667175847, tolerance: 12.047380195048763
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.44710004878, tolerance: 12.300672318079519
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.01160679989, tolerance: 12.143343435858965
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.41069079557, tolerance: 12.340121830457614
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.249764764965, tolerance: 12.506681020255064
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

```

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.79896221671, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.57130095473, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.59210929921, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489197, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.45386687045, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

```



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/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.2566717586, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.4471000488, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.01160679984, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.41069079553, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476492, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

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Duality gap: 36707.79896221666, tolerance: 12.395240465465465
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.5713009547, tolerance: 12.501906826706676
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.592109299265, tolerance: 12.28351822955739
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489195, tolerance: 12.346995798949736
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.453866870404, tolerance: 12.41885041260315
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.25667175859, tolerance: 12.047380195048763
  tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-

```

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packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36066.44710004888, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.011606799926, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.41069079566, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476497, tolerance: 12.506681020255064
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36707.79896221655, tolerance: 12.395240465465465
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)

```

```

/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36643.57130095472, tolerance: 12.501906826706676
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36657.592109299236, tolerance: 12.28351822955739
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36732.87058489198, tolerance: 12.346995798949736
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36977.45386687048, tolerance: 12.41885041260315
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 34582.256671758456, tolerance: 12.047380195048763
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.

```

```

Duality gap: 36066.447100048725, tolerance: 12.300672318079519
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36544.01160679989, tolerance: 12.143343435858965
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 37142.410690795536, tolerance: 12.340121830457614
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: UserWarning: Coordinate
descent with alpha=0 may lead to unexpected results and is discouraged.
    tol, rng, random, positive)
/opt/anaconda3/lib/python3.7/site-
packages/sklearn/linear_model/coordinate_descent.py:471: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations.
Duality gap: 36925.24976476497, tolerance: 12.506681020255064
    tol, rng, random, positive)

```

```

[17]: print('MSE of elastic net: {}'.format(mse_test_elastic))
      print('Number of non-zero coefficients: {}'.format(non_zeros_elastic))
      print('Alpha: {}; Lambda: {}'.format(lm_elastic.l1_ratio_, lm_elastic.alpha_))

```

```

MSE of elastic net: 62.77841555477389
Number of non-zero coefficients: 24
Alpha: 1.0; Lambda: 0.1

```

2.5 Task 5

According to the test MSE, the accuracy of our models, no matter which one, is very limited. The test errors resulting from ridge regression, lasso regression, and elastic net are quite similar with limited difference. The test error of the least squared linear model is a bit higher than other models, which means that the performance of the least square linear model is a little bit worse than others.

```
[ ]:
```