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predicted=31654.510320, expected=31378.000000
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predicted=30175.868715, expected=29918.000000
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predicted=29224.925668, expected=28703.000000
predicted=28363.227929, expected=28309.000000
predicted=28128.098854, expected=27584.000000
predicted=27251.090338, expected=27366.000000
predicted=27265.906394, expected=26957.000000
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predicted=26466.713105, expected=25792.000000
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predicted=25469.514138, expected=25324.000000
predicted=25210.572275, expected=25029.000000
predicted=24893.526795, expected=25204.000000
predicted=25284.361621, expected=24617.000000
predicted=24347.443767, expected=24591.000000
predicted=24579.056844, expected=24242.000000
predicted=24081.736999, expected=24031.000000
predicted=23934.103499, expected=23845.000000
predicted=23759.581959, expected=23769.000000
predicted=23734.092720, expected=23467.000000
predicted=23328.313013, expected=23217.000000
predicted=23102.188903, expected=23052.000000
predicted=22976.219665, expected=22998.000000
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predicted=23015.497696, expected=22849.000000
predicted=22775.055515, expected=22816.000000
predicted=22800.832750, expected=22314.000000
predicted=22083.465525, expected=22720.000000
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predicted=22603.252945, expected=22438.000000
predicted=22345.234745, expected=22489.000000
predicted=22512.401346, expected=22315.000000
predicted=22235.091185, expected=22068.000000
predicted=21954.571019, expected=22279.000000
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predicted=22000.360047, expected=22058.000000
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predicted=22183.266761, expected=22102.000000
predicted=22073.515716, expected=22147.000000
predicted=22167.644054, expected=22143.000000
predicted=22141.146131, expected=22544.000000
predicted=22728.100307, expected=22481.000000
predicted=22452.059294, expected=22456.000000
predicted=22444.506108, expected=22528.000000
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predicted=22438.977537, expected=22947.000000
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predicted=24328.819132, expected=24101.000000
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predicted=29263.138440, expected=29122.000000
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predicted=30262.252020, expected=30307.000000
predicted=30341.926128, expected=30210.000000
```

```
predicted=30165.482347, expected=30176.000000
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predicted=30383.809833, expected=30524.000000
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predicted=33107.778390, expected=33005.000000
predicted=33039.485584, expected=32819.000000
predicted=32733.616003, expected=32884.000000
predicted=32913.891953, expected=32698.000000
predicted=32612.616186, expected=32619.000000
predicted=32582.756782, expected=32430.000000
Traceback (most recent call last):

  File "D:\Documentos\Faculdade\Eletivas\Modelagem Analítica\modelo_arima_previsao.py",
line 60, in <module>
    model_fit = model.fit(disp=0)

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
1197, in fit
    mlefit = super(ARIMA, self).fit(start_params, trend,

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
996, in fit
    mlefit = super(ARMA, self).fit(start_params, method=solver,

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\base\model.py", line 518,
in fit
    xopt, retvals, optim_settings = optimizer._fit(f, score, start_params,

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\base\optimizer.py", line
215, in _fit
    xopt, retvals = func(objective, gradient, start_params, fargs, kwargs,
```

```
  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\base\optimizer.py", line
437, in _fit_lbfgs
    retvals = optimize.fmin_l_bfgs_b(func, start_params, maxiter=maxiter,

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize\lbfgsb.py", line 197, in
fmin_l_bfgs_b
    res = _minimize_lbfgsb(fun, x0, args=args, jac=jac, bounds=bounds,

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize\lbfgsb.py", line 360, in
_minimize_lbfgsb
    f, g = func_and_grad(x)

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize
\_differentiable_functions.py", line 201, in fun_and_grad
    self._update_grad()

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize
\_differentiable_functions.py", line 171, in _update_grad
    self._update_grad_impl()

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize
\_differentiable_functions.py", line 91, in update_grad
    self.g = approx_derivative(fun_wrapped, self.x, f0=self.f,

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize\_numdiff.py", line 426,
in approx_derivative
    return _dense_difference(fun_wrapped, x0, f0, h,

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize\_numdiff.py", line 497,
in _dense_difference
    df = fun(x) - f0

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize\_numdiff.py", line 377,
in fun_wrapped
    f = np.atleast_1d(fun(x, *args, **kwargs))

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize
\_differentiable_functions.py", line 70, in fun_wrapped
    return fun(x, *args)

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\base\model.py", line 500,
in f
    return -self.loglike(params, *args) / nobs

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
810, in loglike
    return self.loglike_kalman(params, set_sigma2)

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
820, in loglike_kalman
    return KalmanFilter.loglike(params, self, set_sigma2)

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\kalmanf
\kalmanfilter.py", line 218, in loglike
    loglike, sigma2 = kalman_loglike.kalman_loglike_double(
```

```
  File "statsmodels\tsa\kalmanf\kalman_loglike.pyx", line 333, in
statsmodels.tsa.kalmanf.kalman_loglike.kalman_loglike_double

  File "<__array_function__ internals>", line 2, in sum

KeyboardInterrupt


In [2]:         'D:/Documentos/Faculdade/Eletivas/Modelagem Analítica/
modelo_arima_previsao.py'     ='D:/Documentos/Faculdade/Eletivas/Modelagem Analítica'
C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:159:
ValueWarning: No frequency information was provided, so inferred frequency 10T will be
used.
  warnings.warn('No frequency information was'
                           ARMA Model Results
==============================================================================
Dep. Variable:                  value   No. Observations:              61343
Model:                     ARMA(1, 0)   Log Likelihood           -437795.128
Method:                       css-mle   S.D. of innovations          304.252
Date:                Tue, 03 Nov 2020   AIC                       875596.257
Time:                        21:12:57   BIC                       875623.330
Sample:                    09-01-2018   HQIC                      875604.657
                         - 11-01-2019
==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
const         2.853e+04    525.554     54.291      0.000    2.75e+04    2.96e+04
ar.L1.value      0.9977      0.000   3641.880      0.000       0.997       0.998
                                    Roots
==============================================================================
                  Real          Imaginary           Modulus         Frequency
------------------------------------------------------------------------------
AR.1            1.0023           +0.0000j            1.0023            0.0000
------------------------------------------------------------------------------
                 0
count  61343.000000
mean      -0.084197
std      304.517596
min    -3140.887713
25%     -194.800756
50%      -13.147789
75%      173.210728
max     1874.508920
predicted=23368.017577, expected=24256.000000
predicted=24265.944156, expected=24260.000000
predicted=24269.934337, expected=23689.000000
predicted=23700.252743, expected=23349.000000
predicted=23361.035188, expected=22896.000000
predicted=22909.075788, expected=22454.000000
predicted=22468.088503, expected=22050.000000
predicted=22065.010234, expected=21672.000000
predicted=21687.872284, expected=21353.000000
predicted=21369.595937, expected=21047.000000
predicted=21064.288166, expected=20873.000000
```

```
predicted=20890.681456, expected=20613.000000
predicted=20631.267081, expected=20065.000000
predicted=20084.501159, expected=19678.000000
predicted=19698.368125, expected=19483.000000
predicted=19503.804098, expected=19439.000000
predicted=19459.898906, expected=19112.000000
predicted=19133.625734, expected=19179.000000
predicted=19200.473540, expected=18931.000000
predicted=18953.024404, expected=18955.000000
predicted=18976.969722, expected=18881.000000
predicted=18903.131187, expected=18622.000000
predicted=18644.704288, expected=18571.000000
predicted=18593.814247, expected=18416.000000
predicted=18439.153938, expected=18563.000000
predicted=18585.825661, expected=18585.000000
predicted=18607.776221, expected=18559.000000
predicted=18581.832846, expected=18451.000000
predicted=18474.068202, expected=18418.000000
predicted=18441.139008, expected=18637.000000
predicted=18659.653540, expected=18695.000000
predicted=18717.523027, expected=19042.000000
predicted=19063.752713, expected=19297.000000
predicted=19318.184084, expected=19197.000000
predicted=19218.403767, expected=19536.000000
predicted=19556.646405, expected=19615.000000
predicted=19635.470331, expected=20244.000000
predicted=20263.062210, expected=21131.000000
predicted=21148.062734, expected=21630.000000
predicted=21645.932066, expected=22017.000000
predicted=22032.050924, expected=22269.000000
predicted=22283.476358, expected=22895.000000
predicted=22908.045984, expected=23342.000000
predicted=23354.020235, expected=24480.000000
predicted=24489.401038, expected=24902.000000
predicted=24910.424808, expected=25373.000000
predicted=25380.335102, expected=25713.000000
predicted=25719.547380, expected=25976.000000
predicted=25981.936079, expected=26230.000000
predicted=26235.345923, expected=27533.000000
predicted=27535.315696, expected=27932.000000
predicted=27933.386223, expected=28214.000000
predicted=28214.729093, expected=28501.000000
predicted=28501.060295, expected=28656.000000
predicted=28655.699085, expected=29138.000000
predicted=29136.575830, expected=29913.000000
predicted=29909.770308, expected=30283.000000
predicted=30278.908974, expected=30883.000000
predicted=30877.513289, expected=31109.000000
predicted=31102.988608, expected=31531.000000
predicted=31524.008470, expected=31761.000000
predicted=31753.475334, expected=32092.000000
predicted=32083.708369, expected=32260.000000
predicted=32251.319440, expected=32433.000000
predicted=32423.919378, expected=32616.000000
predicted=32606.496376, expected=32821.000000
```

```
predicted=32811.023430, expected=32814.000000
predicted=32804.040626, expected=32974.000000
predicted=32963.671349, expected=32986.000000
predicted=32975.644253, expected=33061.000000
Traceback (most recent call last):

  File "D:\Documentos\Faculdade\Eletivas\Modelagem Analítica\modelo_arima_previsao.py",
line 60, in <module>
    model_fit = model.fit(disp=0)

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
996, in fit
    mlefit = super(ARMA, self).fit(start_params, method=solver,

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\base\model.py", line 518,
in fit
    xopt, retvals, optim_settings = optimizer._fit(f, score, start_params,

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\base\optimizer.py", line
215, in _fit
    xopt, retvals = func(objective, gradient, start_params, fargs, kwargs,

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\base\optimizer.py", line
437, in _fit_lbfgs
    retvals = optimize.fmin_l_bfgs_b(func, start_params, maxiter=maxiter,

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize\lbfgsb.py", line 197, in
fmin_l_bfgs_b
    res = _minimize_lbfgsb(fun, x0, args=args, jac=jac, bounds=bounds,

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize\lbfgsb.py", line 360, in
_minimize_lbfgsb
    f, g = func_and_grad(x)

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize
\_differentiable_functions.py", line 200, in fun_and_grad
    self._update_fun()

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize
\_differentiable_functions.py", line 166, in _update_fun
    self._update_fun_impl()

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize
\_differentiable_functions.py", line 73, in update_fun
    self.f = fun_wrapped(self.x)

  File "C:\Users\kelly\anaconda3\lib\site-packages\scipy\optimize
\_differentiable_functions.py", line 70, in fun_wrapped
    return fun(x, *args)

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\base\model.py", line 500,
in f
    return -self.loglike(params, *args) / nobs

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
```

```
810, in loglike
    return self.loglike_kalman(params, set_sigma2)

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
820, in loglike_kalman
    return KalmanFilter.loglike(params, self, set_sigma2)

  File "C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\kalmanf
\kalmanfilter.py", line 218, in loglike
    loglike, sigma2 = kalman_loglike.kalman_loglike_double(

  File "statsmodels\tsa\kalmanf\kalman_loglike.pyx", line 333, in
statsmodels.tsa.kalmanf.kalman_loglike.kalman_loglike_double

  File "<__array_function__ internals>", line 2, in sum
```

KeyboardInterrupt

In [3]:   'D:/Documentos/Faculdade/Eletivas/Modelagem Analítica/
modelo_arima_previsao.py'   ='D:/Documentos/Faculdade/Eletivas/Modelagem Analítica'
C:\Users\kelly\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:159:
ValueWarning: No frequency information was provided, so inferred frequency 10T will be
used.
  warnings.warn('No frequency information was'

```
                        ARMA Model Results
==============================================================================
Dep. Variable:                  value   No. Observations:              61343
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Method:                       css-mle   S.D. of innovations          304.252
Date:                Tue, 03 Nov 2020   AIC                       875596.257
Time:                        21:14:09   BIC                       875623.330
Sample:                    09-01-2018   HQIC                      875604.657
                         - 11-01-2019
==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
const         2.853e+04    525.554     54.291      0.000    2.75e+04    2.96e+04
ar.L1.value      0.9977      0.000   3641.880      0.000       0.997       0.998
                                    Roots
==============================================================================
                  Real          Imaginary           Modulus         Frequency
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AR.1            1.0023           +0.0000j            1.0023            0.0000
------------------------------------------------------------------------------
                0
count  61343.000000
mean      -0.084197
std      304.517596
min    -3140.887713
25%     -194.800756
50%      -13.147789
75%      173.210728
max     1874.508920
predicted=23368.017577, expected=24256.000000
```

```
predicted=24265.944156, expected=24260.000000
predicted=24269.934337, expected=23689.000000
predicted=23700.252743, expected=23349.000000
predicted=23361.035188, expected=22896.000000
predicted=22909.075788, expected=22454.000000
predicted=22468.088503, expected=22050.000000
predicted=22065.010234, expected=21672.000000
predicted=21687.872284, expected=21353.000000
predicted=21369.595937, expected=21047.000000
predicted=21064.288166, expected=20873.000000
predicted=20890.681456, expected=20613.000000
predicted=20631.267081, expected=20065.000000
predicted=20084.501159, expected=19678.000000
predicted=19698.368125, expected=19483.000000
predicted=19503.804098, expected=19439.000000
predicted=19459.898906, expected=19112.000000
predicted=19133.625734, expected=19179.000000
predicted=19200.473540, expected=18931.000000
predicted=18953.024404, expected=18955.000000
predicted=18976.969722, expected=18881.000000
predicted=18903.131187, expected=18622.000000
predicted=18644.704288, expected=18571.000000
predicted=18593.814247, expected=18416.000000
predicted=18439.153938, expected=18563.000000
predicted=18585.825661, expected=18585.000000
predicted=18607.776221, expected=18559.000000
predicted=18581.832846, expected=18451.000000
predicted=18474.068202, expected=18418.000000
predicted=18441.139008, expected=18637.000000
predicted=18659.653540, expected=18695.000000
predicted=18717.523027, expected=19042.000000
predicted=19063.752713, expected=19297.000000
predicted=19318.184084, expected=19197.000000
predicted=19218.403767, expected=19536.000000
predicted=19556.646405, expected=19615.000000
predicted=19635.470331, expected=20244.000000
predicted=20263.062210, expected=21131.000000
predicted=21148.062734, expected=21630.000000
predicted=21645.932066, expected=22017.000000
predicted=22032.050924, expected=22269.000000
predicted=22283.476358, expected=22895.000000
predicted=22908.045984, expected=23342.000000
predicted=23354.020235, expected=24480.000000
predicted=24489.401038, expected=24902.000000
predicted=24910.424808, expected=25373.000000
predicted=25380.335102, expected=25713.000000
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predicted=28655.699085, expected=29138.000000
predicted=29136.575830, expected=29913.000000
```

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predicted=29909.770308, expected=30283.000000
predicted=30278.908974, expected=30883.000000
predicted=30877.513289, expected=31109.000000
predicted=31102.988608, expected=31531.000000
predicted=31524.008470, expected=31761.000000
predicted=31753.475334, expected=32092.000000
predicted=32083.708369, expected=32260.000000
predicted=32251.319440, expected=32433.000000
predicted=32423.919378, expected=32616.000000
predicted=32606.496376, expected=32821.000000
predicted=32811.023430, expected=32814.000000
predicted=32804.040626, expected=32974.000000
predicted=32963.671349, expected=32986.000000
predicted=32975.644253, expected=33061.000000
predicted=33050.471226, expected=33019.000000
predicted=33008.568259, expected=32985.000000
predicted=32974.646914, expected=32876.000000
predicted=32865.898589, expected=32740.000000
predicted=32730.214210, expected=32756.000000
predicted=32746.176772, expected=32760.000000
predicted=32750.167224, expected=32800.000000
predicted=32790.075529, expected=32921.000000
predicted=32910.797260, expected=32910.000000
predicted=32899.821977, expected=32864.000000
predicted=32853.929074, expected=33033.000000
predicted=33022.538803, expected=33096.000000
predicted=33085.394377, expected=32938.000000
predicted=32927.758717, expected=32792.000000
predicted=32782.096169, expected=32709.000000
predicted=32699.287840, expected=32421.000000
predicted=32411.954117, expected=32260.000000
predicted=32251.325754, expected=32003.000000
predicted=31994.920900, expected=31865.000000
predicted=31857.241350, expected=31579.000000
predicted=31571.903991, expected=31500.000000
predicted=31493.087364, expected=31321.000000
predicted=31314.503141, expected=31141.000000
predicted=31134.920642, expected=31138.000000
predicted=31131.927901, expected=31089.000000
predicted=31083.041863, expected=31100.000000
predicted=31094.016397, expected=30920.000000
predicted=30914.434532, expected=31101.000000
predicted=31095.014249, expected=31018.000000
predicted=31012.207235, expected=30933.000000
predicted=30927.404456, expected=31038.000000
predicted=31032.161227, expected=31023.000000
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