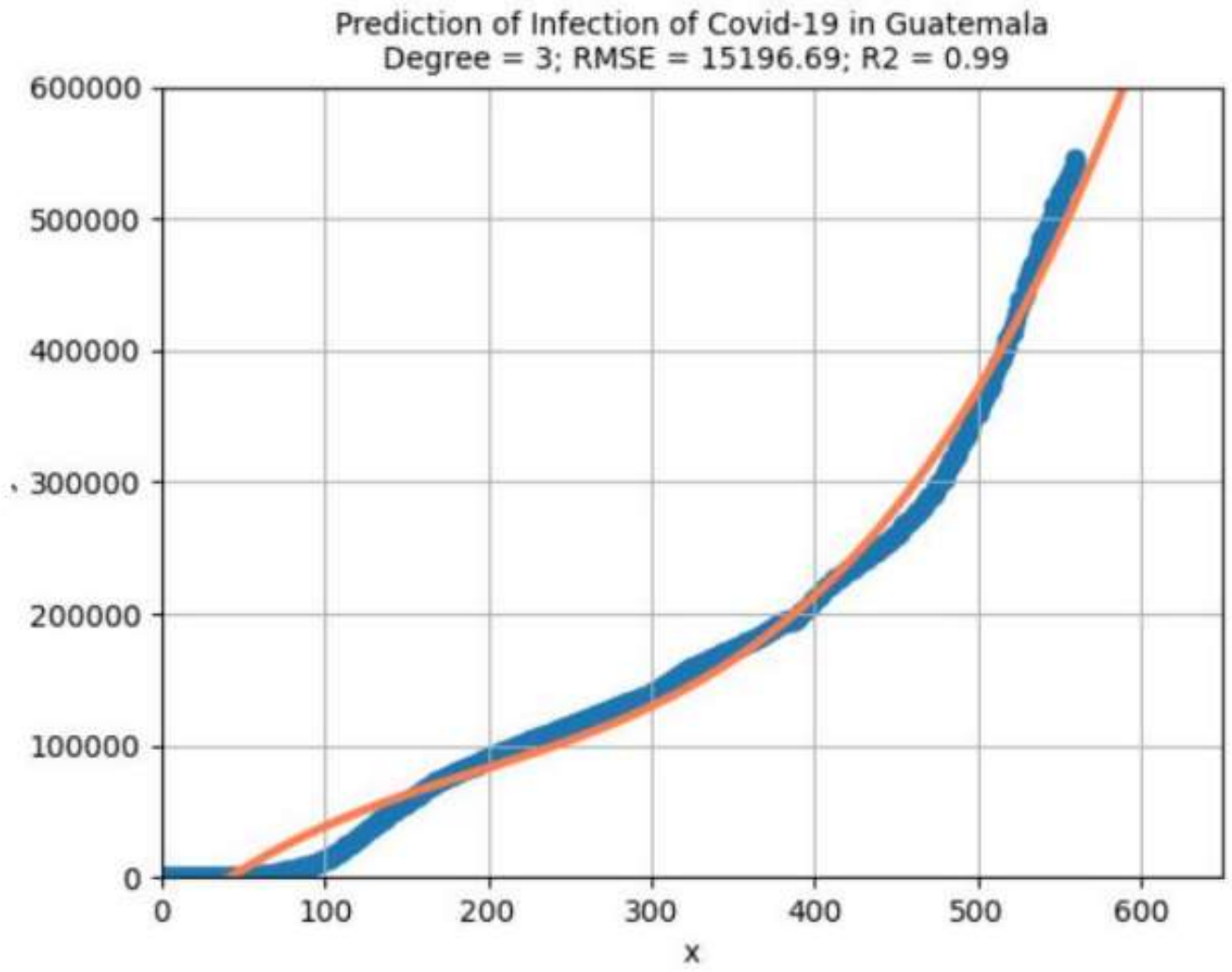
JUAN PABLO ALVARADO VELASQUEZ
201700511

Tarea 7

Gráfica resultante



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Código utilizado

```
from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import PolynomialFeatures
from sklearn.metrics import mean_squared_error, r2_score
import matplotlib.pyplot as plt
import numpy as np
# data obtenida del MSPS
x = np.asarray([0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,
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142,143,144,145,146,147,148,149,150,151,152,153,154,155,156,157,18,159,160,161,162,163,164,165,166,167,168,169,170,171,172,173,174,175,176,177,178,179,180,181,
182,183,184,185,186,187,188,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,
222,223,224,225,226,227,228,229,230,231,232,233,234,235,236,237,238,239,240,241,242,243,244,245,246,247,248,249,250,251,252,253,254,255,256,257,258,259,260,261,
262,263,264,265,266,267,268,269,270,271,272,273,274,275,276,277,278,279,280,281,282,283,284,285,286,287,288,289,290,291,292,293,294,295,296,297,298,299,300,301,
302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,319,320,321,322,323,324,325,326,327,328,329,330,331,332,333,334,335,336,337,338,339,340,341,
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422,423,424,425,426,427,428,429,430,431,432,433,434,435,436,437,438,439,440,441,442,443,444,445,446,447,448,449,450,451,452,453,454,455,456,457,458,459,460,461,
462,463,464,465,466,467,468,469,470,471,472,473,474,475,476,477,478,479,480,481,482,483,484,485,486,487,488,489,490,491,492,493,494,495,496,497,498,499,500,501,
502,503,504,505,506,507,508,509,510,511,512,513,514,515,516,517,518,519,520,521,522,523,524,525,526,527,528,529,530,531,532,533,534,535,536,537,538,539,540,541,
542,543,544,545,546,547,548,549,550,551,552,553,554,555,556,557,558,559,560])[:,np.newaxis]

y = np.asarray([0,1,1,7,7,8,11,15,20,21,24,24,27,31,31,37,40,43,46,52,54,60,69,71,81,86,93,133,143,149,168,177,181,189,263,282,289,292,310,323,389,430,473,485,
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])[:,np.newaxis]

plt.scatter(x,y)
```

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```
48  # regression transform
49  poly_degree = 3
50  polynomial_features = PolynomialFeatures(degree = poly_degree)
51  x_transform = polynomial_features.fit_transform(x)
52
53  # fit the model
54  model = LinearRegression().fit(x_transform, y)
55  y_new = model.predict(x_transform)
56
57  # calculate rmse and r2
58  rmse = np.sqrt(mean_squared_error(y, y_new))
59  r2 = r2_score(y, y_new)
60  print('RMSE: ', rmse)
61  print('R2: ', r2)
62
63  # prediction
64  x_new_min = 0.0
65  x_new_max = 650.0
66  x_new = np.linspace(x_new_min, x_new_max, 650)
67  x_new = x_new[:,np.newaxis]
68  x_new_transform = polynomial_features.fit_transform(x_new)
69  y_new = model.predict(x_new_transform)
70
71  # plot the prediction
72  plt.plot(x_new, y_new, color='coral', linewidth=3)
73  plt.grid()
74  plt.xlim(x_new_min,x_new_max)
75  plt.ylim(0,700000)
76  title = 'Degree = {}; RMSE = {}; R2 = {}'.format(poly_degree, round(rmse,2),
77  round(r2,2))
78  plt.title("Prediction of Infection of Covid-19 in Guatemala\n " + title,
79  fontsize=10)
80  plt.xlabel('x')
81  plt.ylabel('y')
```