Log Plots in Python

How to make Log plots in Python with Plotly.

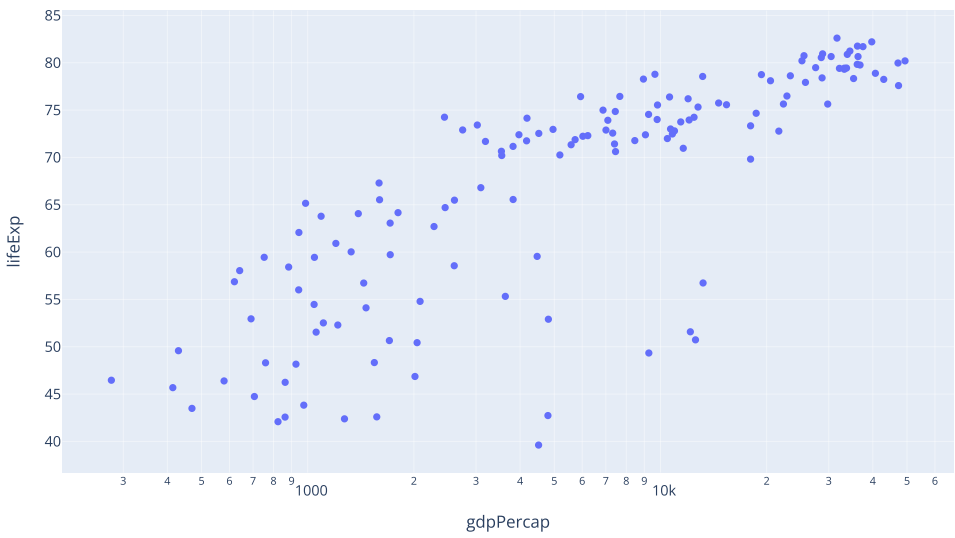
This page shows examples of how to configure 2-dimensional Cartesian axes (/python/figure-structure/#2d-cartesian-trace-types-and-subplots) to follow a logarithmic rather than linear progression. Configuring gridlines, ticks, tick labels and axis titles (/python/axes/) on logarithmic axes is done the same was as with linear axes (/python/axes/).

Logarithmic Axes with Plotly Express

Plotly Express (/python/plotly-express/) is the easy-to-use, high-level interface to Plotly, which operates on a variety of types of data (/python/px-arguments/) and produces easy-to-style figures (/python/styling-plotly-express/).

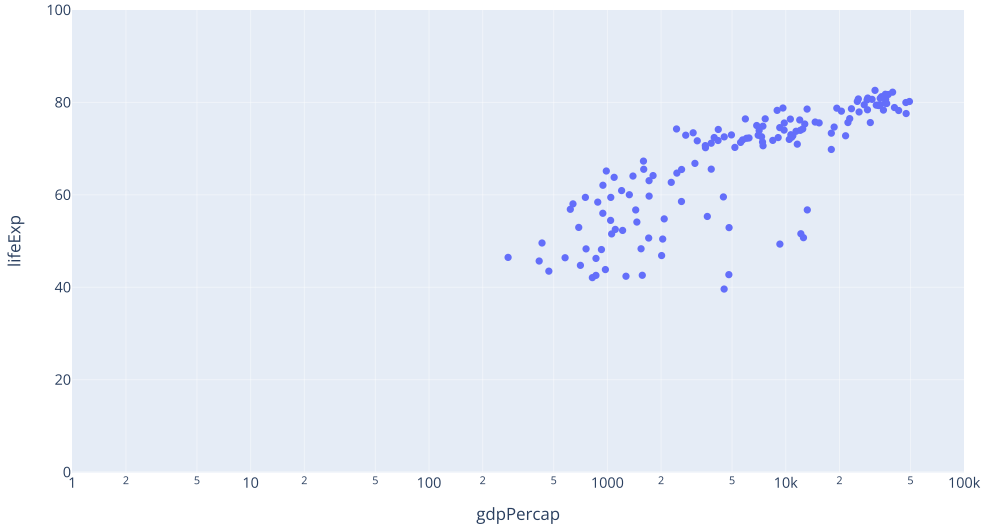
All of Plotly Express' 2-D Cartesian functions include the `log_x` and `log_y` keyword arguments, which can be set to `True` to set the corresponding axis to a logarithmic scale:

```
import plotly.express as px
df = px.data.gapminder().query("year == 2007")

fig = px.scatter(df, x="gdpPercap", y="lifeExp", hover_name="country", log_x=True)
fig.show()
```



Setting the range of a logarithmic axis with Plotly Express works the same was as with linear axes: using the `range_x` and `range_y` keywords. Note that you cannot set the range to include 0 or less.

```
import plotly.express as px
df = px.data.gapminder().query("year == 2007")

fig = px.scatter(df, x="gdpPercap", y="lifeExp", hover_name="country",
                 log_x=True, range_x=[1,100000], range_y=[0,100])
fig.show()
```



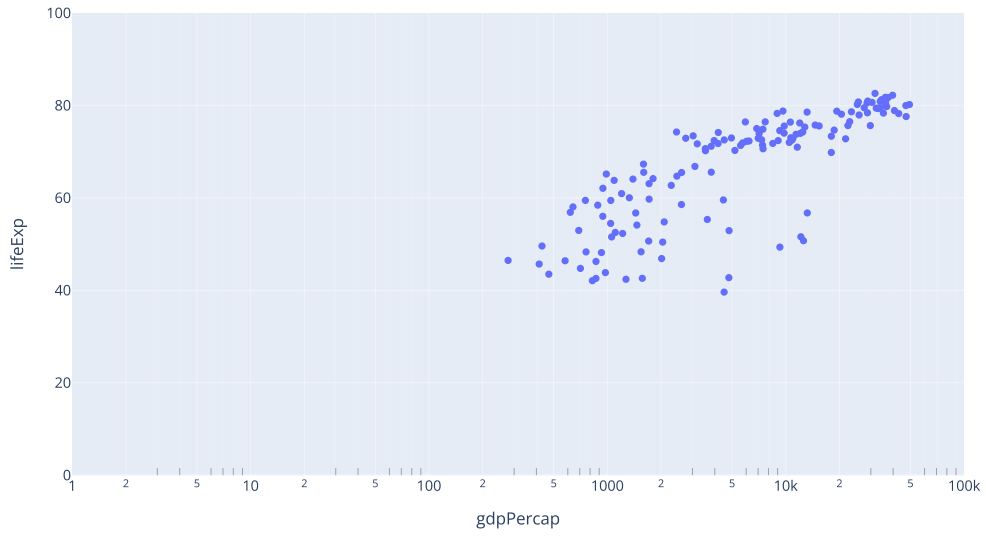
Adding minor ticks

new in 5.8

You can position and style minor ticks using `minor`. This takes a `dict` of properties to apply to minor ticks. See the figure reference (https://plotly.com/python/reference/layout/xaxis/#layout-xaxis-minor) for full details on the accepted keys in this dict.

In this example we set the tick length with `ticklen`, add the ticks on the inside with `ticks="inside"`, and turn grid lines on with `howgrid=True`.

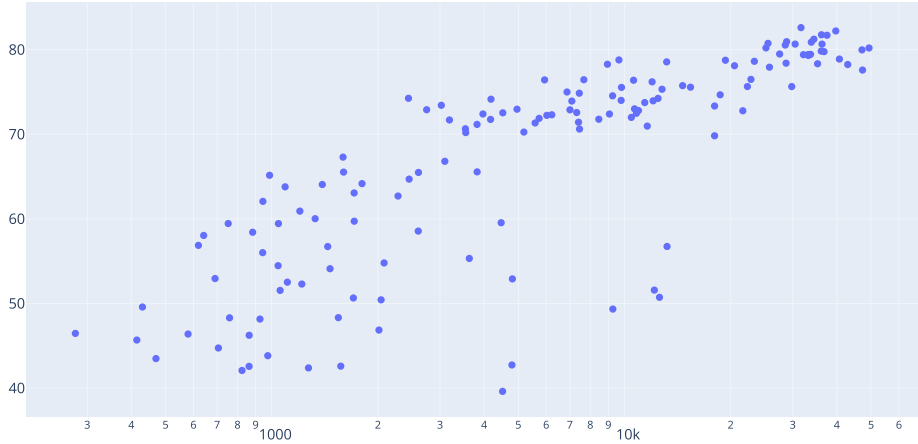
```
import plotly.express as px
df = px.data.gapminder().query("year == 2007")

fig = px.scatter(df, x="gdpPercap", y="lifeExp", hover_name="country",
                 log_x=True, range_x=[1,100000], range_y=[0,100])

fig.update_xaxes(minor=dict(ticks="inside", ticklen=6, showgrid=True))

fig.show()
```



Logarithmic Axes with Graph Objects

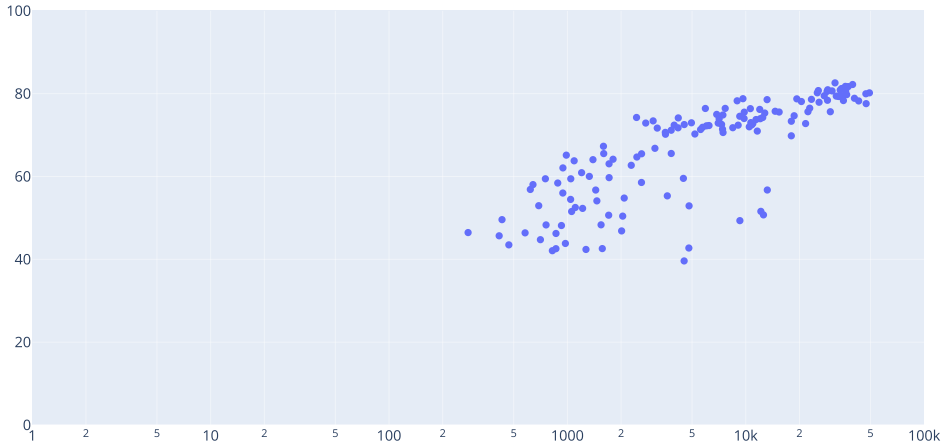
If Plotly Express does not provide a good starting point, it is also possible to use the more generic go.Figure class from plotly.graph_objects (/python/graph-objects/).

```
import plotly.graph_objects as go
import plotly.express as px
df = px.data.gapminder().query("year == 2007")

fig = go.Figure()

fig.add_trace(go.Scatter(mode="markers", x=df["gdpPercap"], y=df["lifeExp"] ))

fig.update_xaxes(type="log")
fig.show()
```



Setting the range of a logarithmic axis with plotly.graph_objects is *very different* than setting the range of linear axes: the range is set using the exponent rather than the actual value:

```
import plotly.graph_objects as go
import plotly.express as px
df = px.data.gapminder().query("year == 2007")

fig = go.Figure()

fig.add_trace(go.Scatter(mode="markers", x=df["gdpPercap"], y=df["lifeExp"] ))

fig.update_xaxes(type="log", range=[0,5]) # log range: 10^0=1, 10^5=100000
fig.update_yaxes(range=[0,100]) # linear range
fig.show()
```



Reference

See function reference for px.(scatter) (https://plotly.com/python-api-reference/generated/plotly.express.scatter) or https://plotly.com/python/reference/layout/xaxis/#layout-xaxis-type (https://plotly.com/python/reference/layout/xaxis/#layout-xaxis-type) for more information and chart attribute options!

What About Dash?

Dash (https://dash.plot.ly/) is an open-source framework for building analytical applications, with no Javascript required, and it is tightly integrated with the Plotly graphing library.

Learn about how to install Dash at https://dash.plot.ly/installation (https://dash.plot.ly/installation).

Everywhere in this page that you see fig.show(), you can display the same figure in a Dash application by passing it to the figure argument of the Graph component (https://dash.plot.ly/dash-core-components/graph) from the built-in dash_core_components package like this:

```
import plotly.graph_objects as go # or plotly.express as px
fig = go.Figure() # or any Plotly Express function e.g. px.bar(...)
# fig.add_trace( ... )
# fig.update_layout( ... )

from dash import Dash, dcc, html

app = Dash()
app.layout = html.Div([
                                    =fig)

                                    use_reloader=False)  # Turn off reloader if inside Jupyter
```

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