

04-Changing-Seasonality

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1 Changing Seasonality

```
[2]: import pandas as pd
      from fbprophet import Prophet
      %matplotlib inline
```

```
[5]: df = pd.read_csv('../Data/airline_passengers.csv')
```

```
[6]: df.head()
```

```
[6]:
```

	Month	Thousands of Passengers
0	1949-01	112
1	1949-02	118
2	1949-03	132
3	1949-04	129
4	1949-05	121

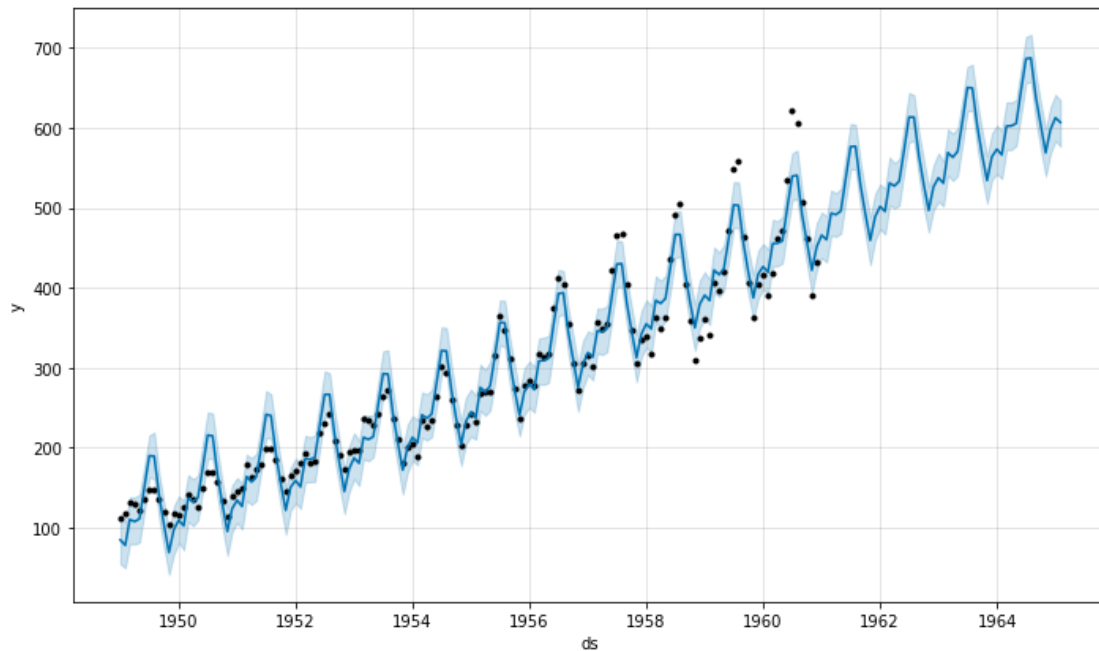
```
[7]: df.columns = ['ds', 'y']
      df['ds'] = pd.to_datetime(df['ds'])
```

```
[8]: m = Prophet()
      m.fit(df)
      future = m.make_future_dataframe(50, freq='MS')
      forecast = m.predict(future)
      fig = m.plot(forecast)
```

INFO:fbprophet:Disabling weekly seasonality. Run prophet with weekly_seasonality=True to override this.

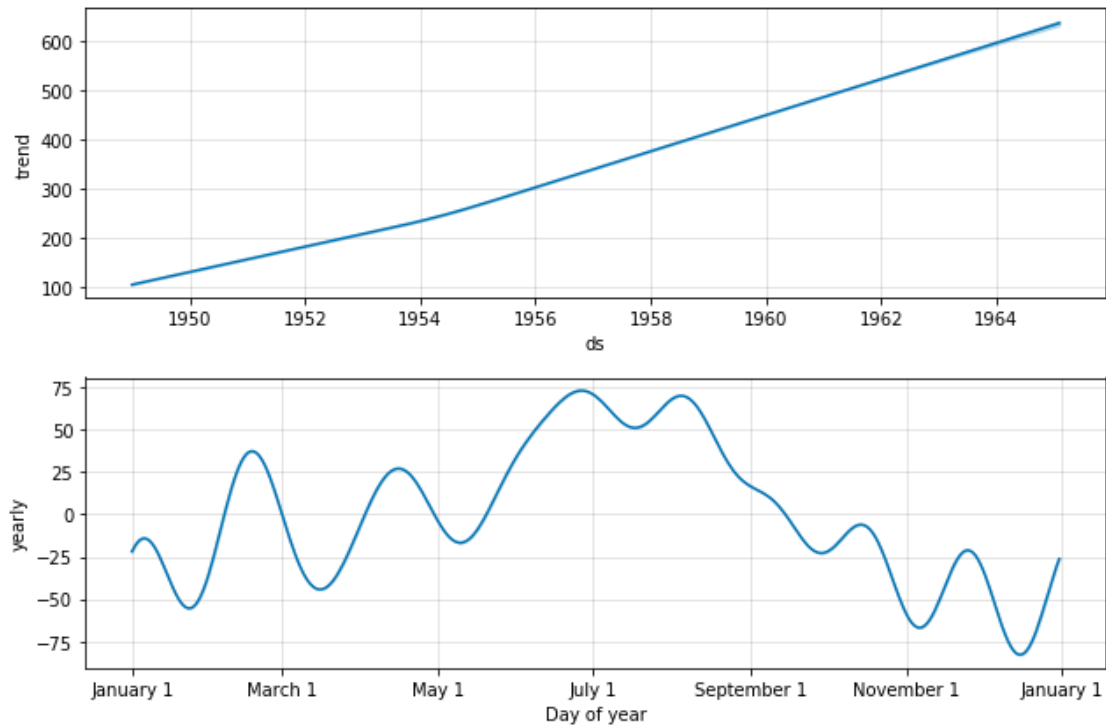
INFO:fbprophet:Disabling daily seasonality. Run prophet with daily_seasonality=True to override this.

```
/anaconda3/lib/python3.6/site-packages/pystan/misc.py:399: FutureWarning:
Conversion of the second argument of issubdtype from `float` to `np.floating` is
deprecated. In future, it will be treated as `np.float64 ==
np.dtype(float).type`.
    elif np.issubdtype(np.asarray(v).dtype, float):
```

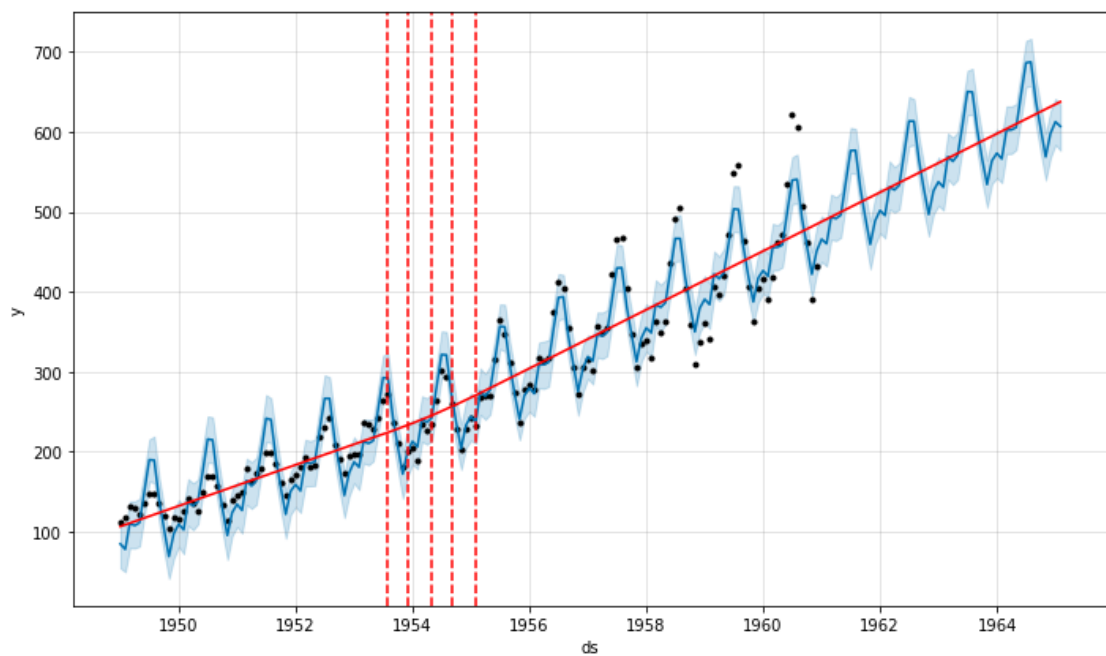


This time series has a clear yearly cycle, but the seasonality in the forecast is too large at the start of the time series and too small at the end. In this time series, the seasonality is not a constant additive factor as assumed by Prophet, rather it grows with the trend. This is multiplicative seasonality.

```
[10]: fig = m.plot_components(forecast)
```



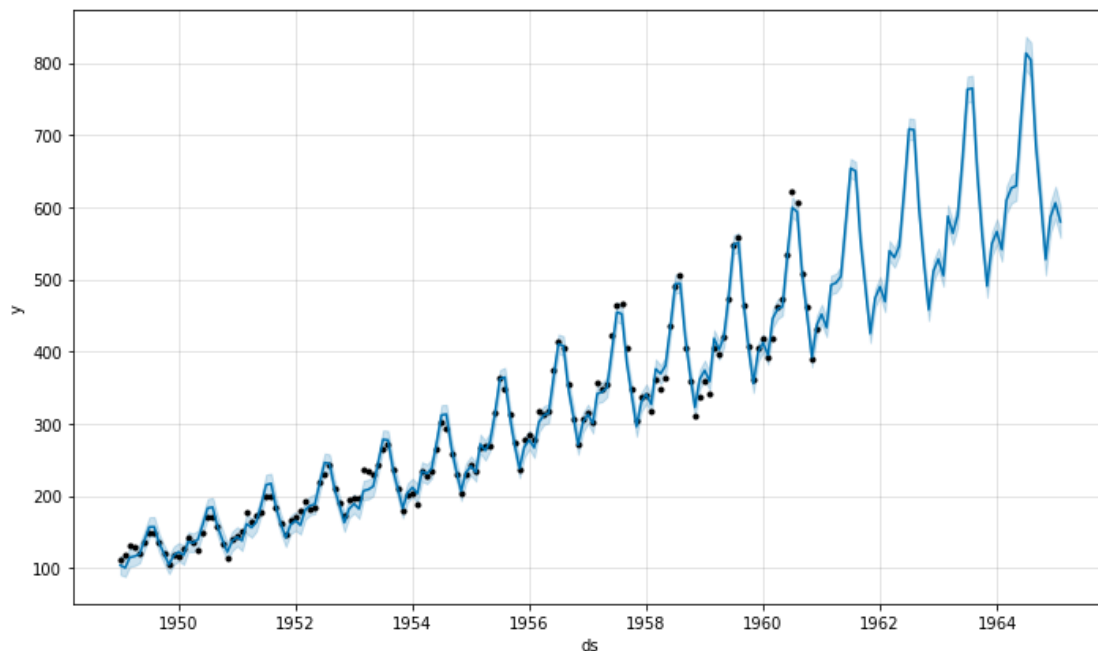
```
[9]: from fbprophet.plot import add_changepoints_to_plot
fig = m.plot(forecast)
a = add_changepoints_to_plot(fig.gca(), m, forecast)
```



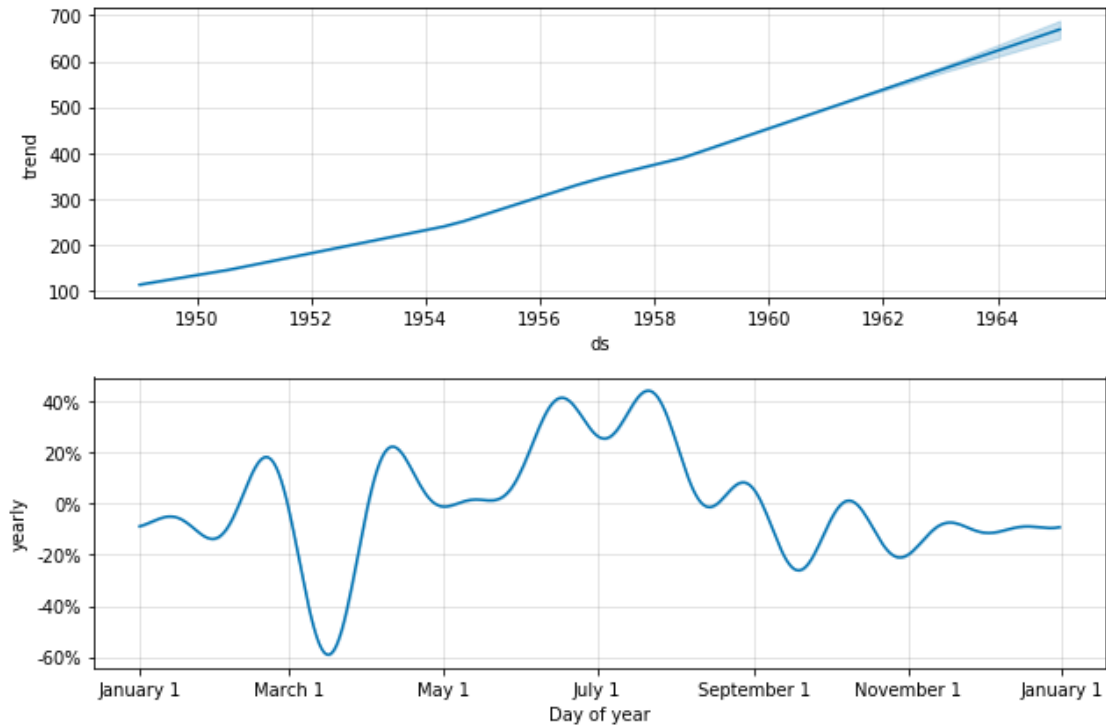
1.0.1 Change to Multiplicative

```
[11]: m = Prophet(seasonality_mode='multiplicative')
      m.fit(df)
      forecast = m.predict(future)
      fig = m.plot(forecast)
```

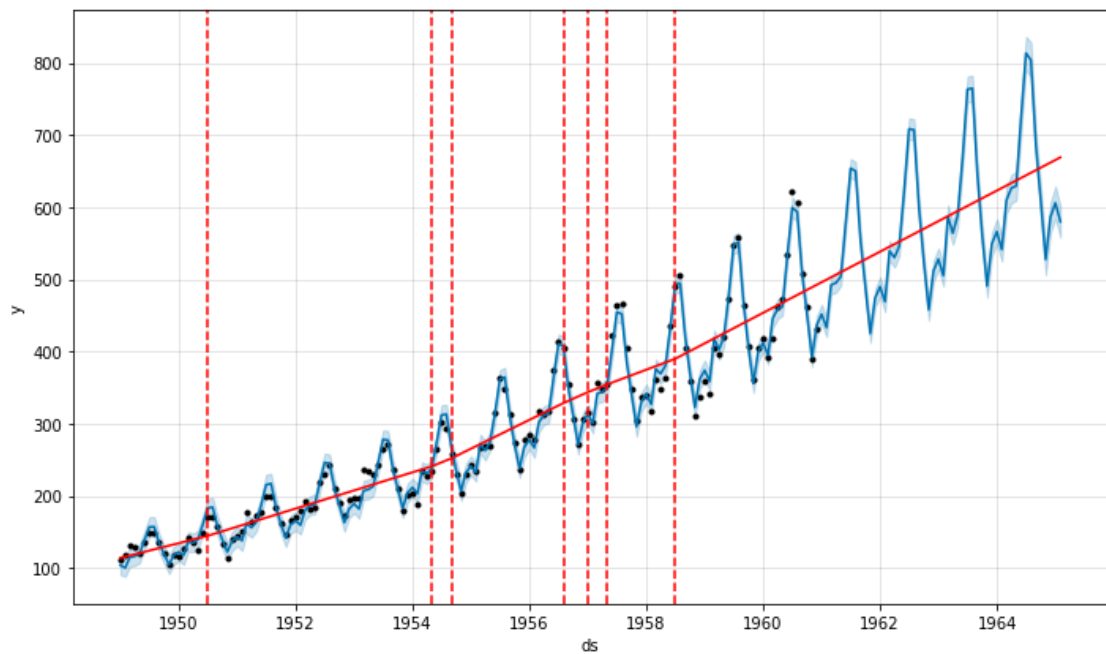
INFO:fbprophet:Disabling weekly seasonality. Run prophet with weekly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with daily_seasonality=True to override this.
/anaconda3/lib/python3.6/site-packages/pystan/misc.py:399: FutureWarning: Conversion of the second argument of issubdtype from `float` to `np.floating` is deprecated. In future, it will be treated as `np.float64 == np.dtype(float).type`.
elif np.issubdtype(np.asarray(v).dtype, float):



```
[13]: fig = m.plot_components(forecast)
```



```
[12]: from fbprophet.plot import add_changepoints_to_plot
fig = m.plot(forecast)
a = add_changepoints_to_plot(fig.gca(), m, forecast)
```



[]: