Analyse de la courbe des taux (Yield Curve)

Ce projet a pour objectif d'analyser la structure par terme des taux d'intérêt, appelée yield curve, afin de mieux comprendre les anticipations du marché concernant la croissance économique, l'inflation et la politique monétaire.

```python
import pandas as pd
import numpy as np
import plotly.graph_objects as go
import plotly.express as px
```

USA

```python
data = pd.read_csv("daily-treasury-rates.csv")

df=data

df.tail(10)
```

	Date	1 Mo	1.5 Month	2 Mo	3 Mo	4 Mo	6 Mo	1 Yr	2 Yr	3 Yr
118	2025-01-15	4.40	NaN	4.34	4.35	4.32	4.26	4.19	4.27	4.34
119	2025-01-14	4.42	NaN	4.35	4.36	4.33	4.29	4.22	4.37	4.46
120	2025-01-13	4.42	NaN	4.36	4.37	4.34	4.30	4.24	4.40	4.49
121	2025-01-10	4.42	NaN	4.35	4.36	4.33	4.27	4.25	4.40	4.46
122	2025-01-09	4.44	NaN	4.36	4.35	4.31	4.24	4.16	4.27	4.31
123	2025-01-08	4.41	NaN	4.34	4.35	4.31	4.25	4.19	4.28	4.31
124	2025-01-07	4.42	NaN	4.35	4.35	4.31	4.24	4.19	4.30	4.33
125	2025-01-06	4.43	NaN	4.36	4.35	4.31	4.24	4.17	4.28	4.30
126	2025-01-03	4.44	NaN	4.35	4.34	4.31	4.25	4.18	4.28	4.32
127	2025-01-02	4.45	NaN	4.36	4.36	4.31	4.25	4.17	4.25	4.29

	5 Yr	7 Yr	10 Yr	20 Yr	30 Yr
118	4.45	4.55	4.66	4.95	4.88
119	4.59	4.70	4.78	5.06	4.98
120	4.61	4.71	4.79	5.05	4.97

```
121   4.59   4.70   4.77   5.04   4.96
122   4.46   4.57   4.68   4.98   4.92
123   4.45   4.56   4.67   4.97   4.91
124   4.46   4.57   4.67   4.97   4.91
125   4.42   4.52   4.62   4.91   4.85
126   4.41   4.51   4.60   4.88   4.82
127   4.38   4.47   4.57   4.86   4.79
```

On prend le 1er de chaque moi + la date d'aujourd'hui

```python
df['Date'] = pd.to_datetime(df['Date'])

# Filtrer les lignes dont le jour est le 1er OU la date exacte est le
8 juillet 2025
filtered_df = df[(df['Date'].dt.day == 1) | (df['Date'] ==
pd.Timestamp('2025-07-08'))]

# Trier dans l'ordre croissant si nécessaire
filtered_df =
filtered_df.sort_values(by='Date').reset_index(drop=True)

filtered_df

        Date  1 Mo  1.5 Month  2 Mo  3 Mo  4 Mo  6 Mo  1 Yr  2 Yr  3
Yr  5 Yr  \
0 2025-04-01  4.38       4.36  4.35  4.32  4.30  4.23  4.01  3.87
3.85  3.91
1 2025-05-01  4.38       4.36  4.34  4.31  4.38  4.22  3.92  3.70
3.69  3.81
2 2025-07-01  4.32       4.44  4.42  4.40  4.35  4.29  3.98  3.78
3.75  3.84
3 2025-07-08  4.36       4.41  4.46  4.42  4.42  4.34  4.11  3.90
3.86  3.99

   7 Yr  10 Yr  20 Yr  30 Yr
0  4.03   4.17   4.56   4.52
1  4.02   4.25   4.75   4.74
2  4.03   4.26   4.79   4.78
3  4.18   4.42   4.95   4.94

maturities = filtered_df.columns.drop('Date')

import pandas as pd
import plotly.graph_objects as go

# On suppose que 'Date' est déjà en datetime
# Sélection des colonnes de maturité (hors 'Date')
maturities = filtered_df.columns.drop('Date')

# Initialiser la figure
```
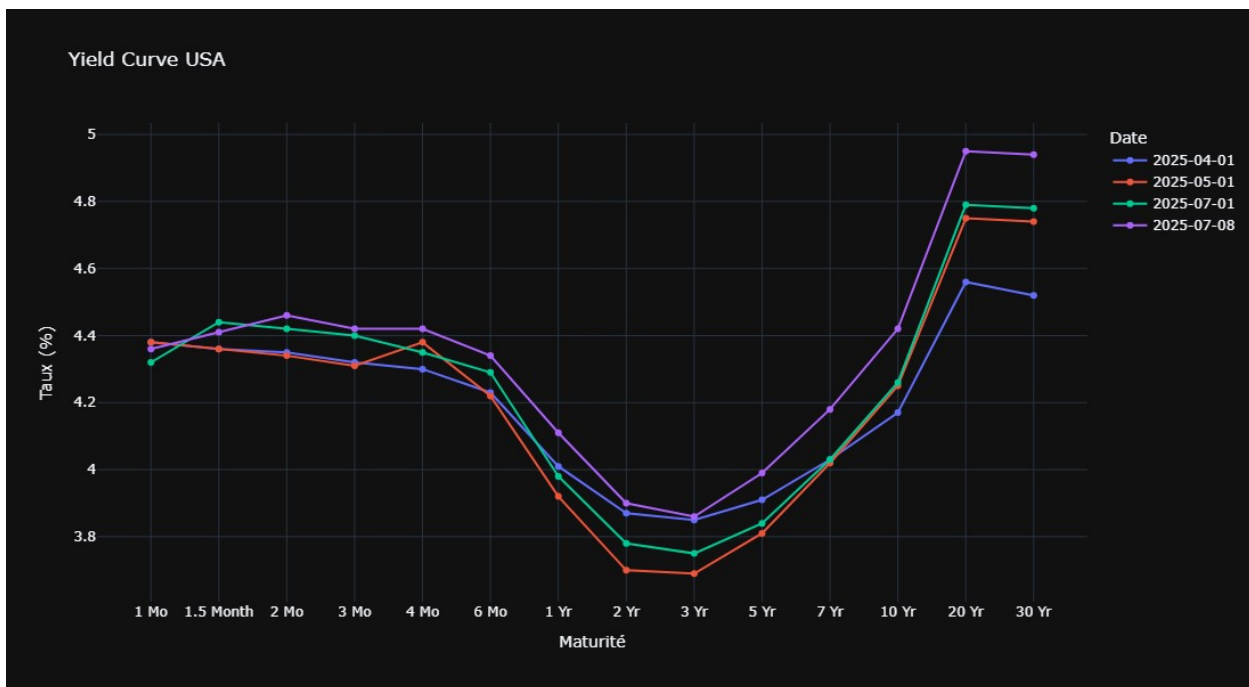
```python
fig = go.Figure()

# Ajouter une courbe pour chaque date
for idx, row in filtered_df.iterrows():
    fig.add_trace(go.Scatter(
        x=maturities,
        y=row[maturities],
        mode='lines+markers',
        name=row['Date'].strftime('%Y-%m-%d')
    ))

# Mise en forme
fig.update_layout(
    title="Yield Curve USA",
    xaxis_title="Maturité",
    yaxis_title="Taux (%)",
    template="plotly_dark",  # optionnel
    legend_title="Date",
    width=1100, height=600,
)

fig.show()
```



```python
import plotly.express as px
df_melted = filtered_df.melt(id_vars='Date', var_name='Maturité',
value_name='Taux')

fig = px.line(df_melted, x='Maturité', y='Taux', color='Date',
```
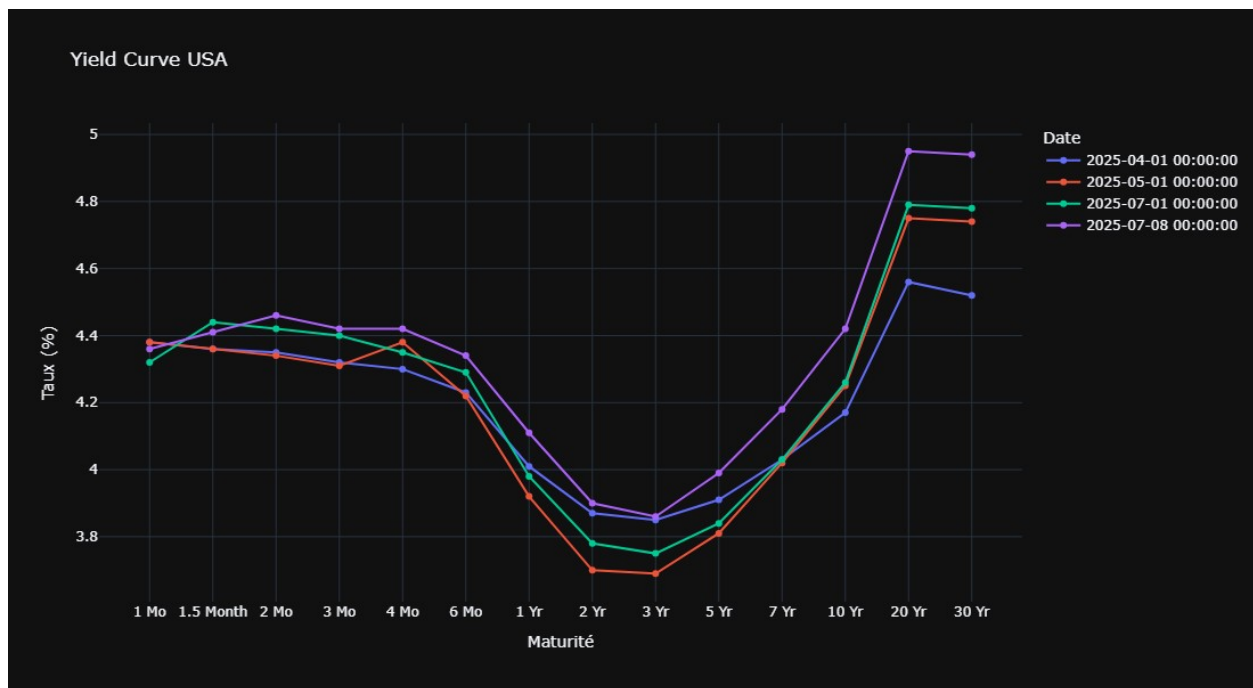
```
markers=True,
                title="Yield Curve par Date (px.line)")
# Mise en forme
fig.update_layout(
    title="Yield Curve USA",
    xaxis_title="Maturité",
    yaxis_title="Taux (%)",
    template="plotly_dark",
    legend_title="Date",
    width=1100, height=600,
)
fig.show()
```


France

```
df_fr=pd.read_csv("yield_curve_data France.csv")
df_fr
```

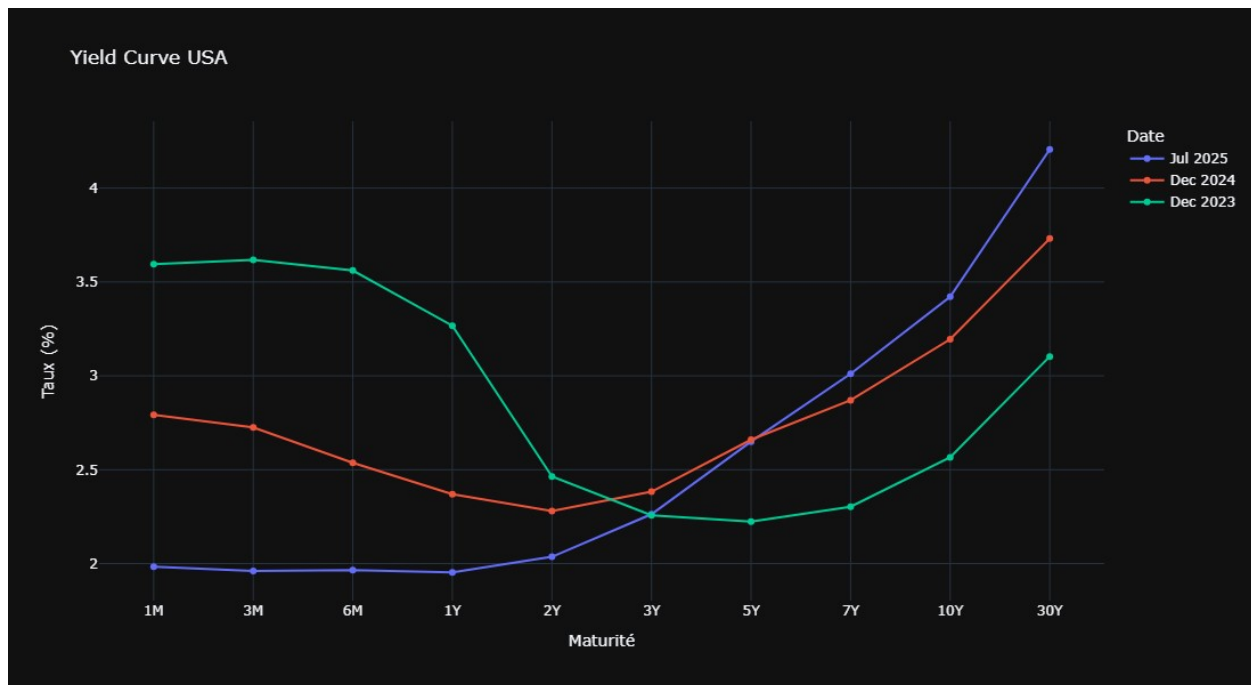| Period	1M	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
0 Jul 2025	1.984	1.960	1.965	1.953	2.036	2.263	2.650	3.011	3.421
1 Dec 2024	2.792	2.725	2.537	2.370	2.280	2.383	2.660	2.870	3.195
2 Dec 2023	3.595	3.617	3.561	3.267	2.464	2.257	2.223	2.303	2.566

```
      30Y
0  4.206
1  3.731
2  3.103
```

```python
import plotly.express as px
df_melted2 = df_fr.melt(id_vars='Period', var_name='Maturité',
value_name='Taux')

fig = px.line(df_melted2, x='Maturité', y='Taux', color='Period',
markers=True,
              title="Yield Curve par Date (px.line)")
# Mise en forme
fig.update_layout(
    title="Yield Curve USA",
    xaxis_title="Maturité",
    yaxis_title="Taux (%)",
    template="plotly_dark",
    legend_title="Date",
    width=1100, height=600,
)
fig.show()
```


Allemagne

```python
df_ger=pd.read_csv("germany_yield_curve_data.csv")
df_ger.drop('10Y - 2Y',axis=1,inplace=True)
```

```
df_ger
```

```
      Period     1M      3M      6M      1Y      2Y      3Y      5Y      7Y
10Y  \
0  Jul 2025   1.698   1.814   1.782   1.796   1.895   1.995   2.237   2.448
2.686
1  Dec 2024   2.902   2.551   2.474   2.249   2.095   2.019   2.157   2.192
2.362
2  Dec 2023   3.652   3.595   3.606   3.194   2.402   2.324   1.949   1.941
2.031

      30Y
0  3.238
1  2.592
2  2.279
```

```python
df_melted3 = df_ger.melt(id_vars='Period', var_name='Maturité',
value_name='Taux')

fig = px.line(df_melted3, x='Maturité', y='Taux', color='Period',
markers=True,
                title="Yield Curve par Date (px.line)")
# Mise en forme
fig.update_layout(
    title="Yield Curve USA",
    xaxis_title="Maturité",
    yaxis_title="Taux (%)",
    template="plotly_dark",
    legend_title="Date",
    width=1100, height=600,
)
fig.show()
```
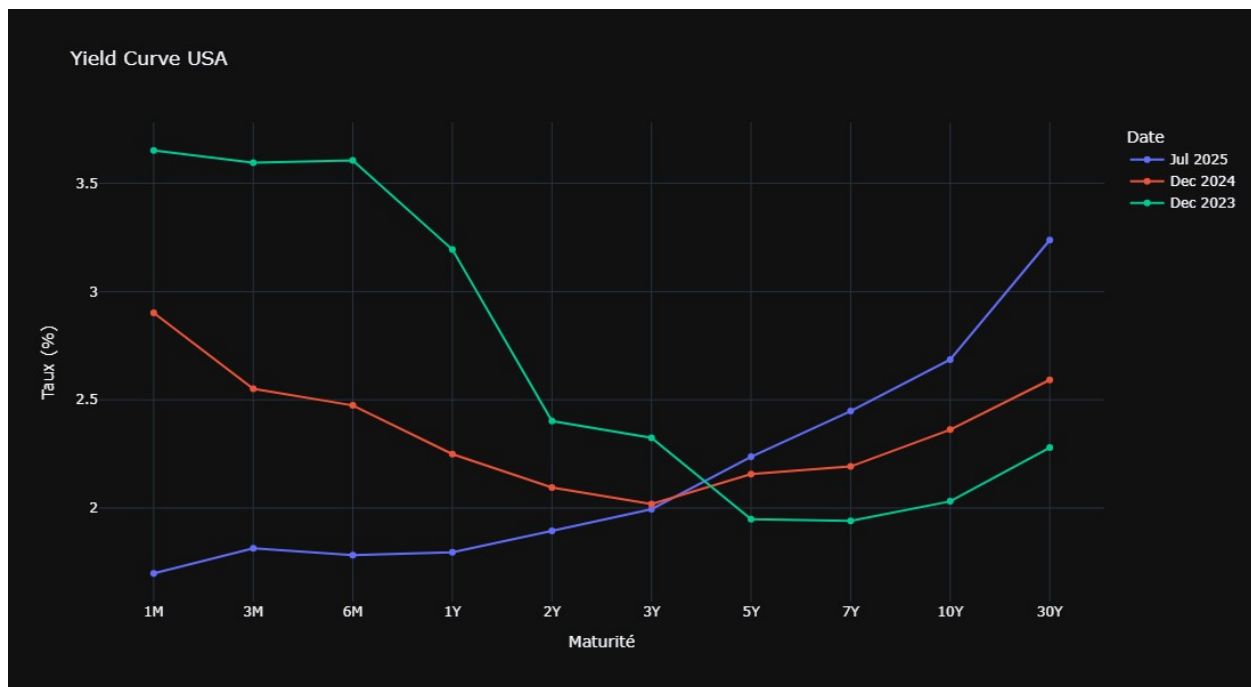
Japon

```python
df_jap=pd.read_csv("spread_curve_data Japon.csv")
df_jap.drop('10Y - 2Y',axis=1,inplace=True)
df_jap
```

```
     Period     1M     3M     6M     1Y     2Y     3Y     5Y     7Y
10Y  \
0  Jul 2025  0.456  0.431  0.462  0.616  0.774  0.857  1.061  1.271
1.529
1  Dec 2024  0.155  0.218  0.243  0.461  0.599  0.610  0.728  0.838
1.070
2  Dec 2023 -0.132 -0.221 -0.162 -0.022  0.046  0.067  0.218  0.393
0.625

     30Y
0  3.047
1  2.255
2  1.671
```

```python
df_melted4 = df_jap.melt(id_vars='Period', var_name='Maturité',
value_name='Taux')

fig = px.line(df_melted4, x='Maturité', y='Taux', color='Period',
markers=True,
              title="Yield Curve par Date (px.line)")
# Mise en forme
fig.update_layout(
```

```
    title="Yield Curve USA",
    xaxis_title="Maturité",
    yaxis_title="Taux (%)",
    template="plotly_dark",
    legend_title="Date",
    width=1100, height=600,
)
fig.show()
```