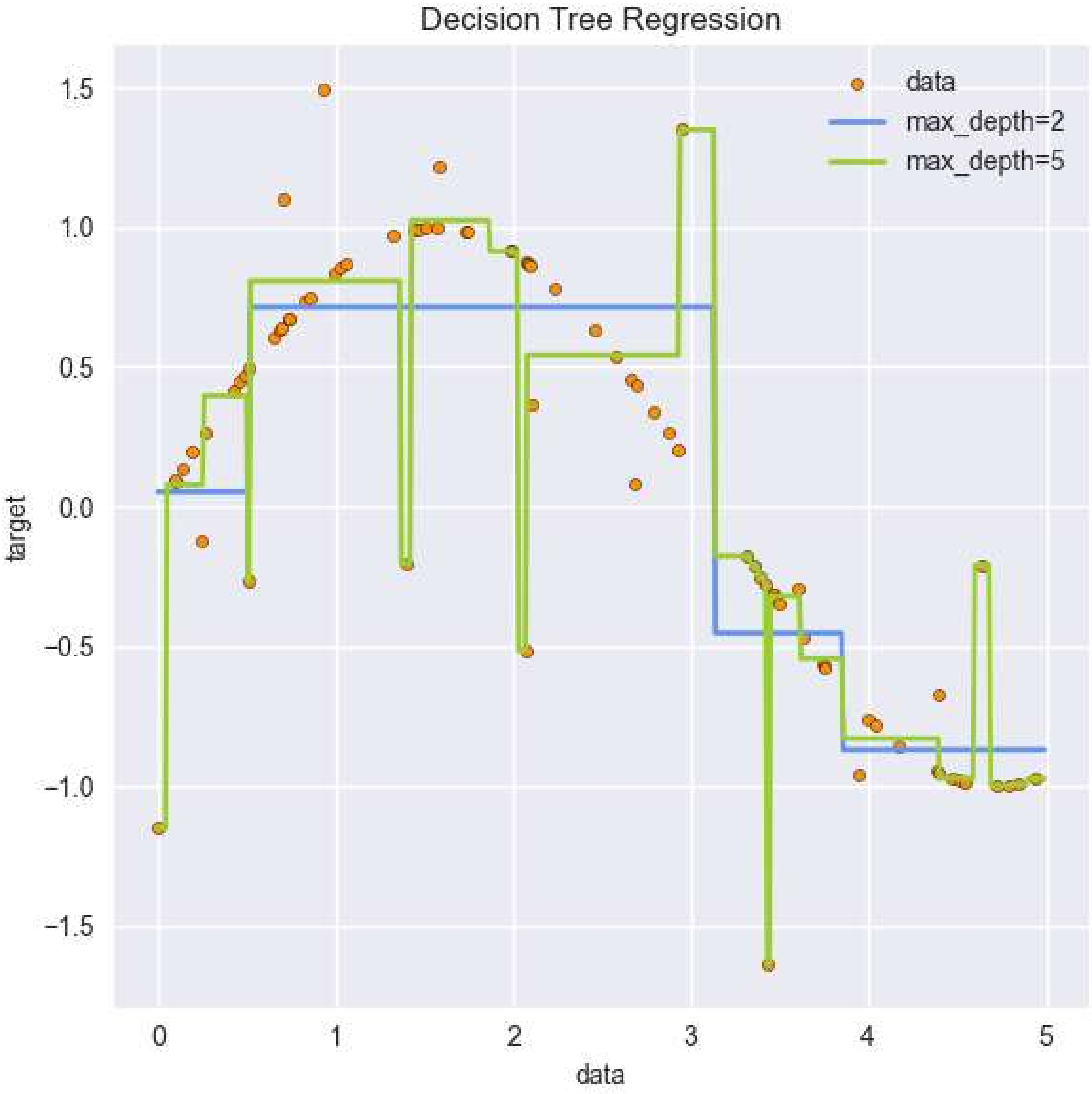
In [1]:

```
# 导入操作系统库
import os
# 更改工作目录
os.chdir(r"D:\softwares\applied statistics\pythoncodelearning\chap5\sourcecode")
# 导入基础计算库
import numpy as np
# 导入绘图库
import matplotlib.pyplot as plt
# 导入决策树分类器
from sklearn.tree import DecisionTreeRegressor
# 导入绘图库中的字体管理包
from matplotlib import font_manager
# 实现中文字符正常显示
font = font_manager.FontProperties(fname=r"C:\Windows\Fonts\SimKai.ttf")
# 使用seaborn风格绘图
plt.style.use("seaborn-v0_8")
# 生成数据
np.random.seed(1)
X = np.sort(5 * np.random.rand(80, 1), axis=0)
y = np.sin(X).ravel()
y[::5] += 3 * (0.5 - np.random.rand(16))
# 构造回归树模型
regr_1 = DecisionTreeRegressor(max_depth=2)
regr_2 = DecisionTreeRegressor(max_depth=5)
# 模型拟合
regr_1.fit(X, y)
regr_2.fit(X, y)
# 预测
X_test = np.arange(0.0, 5.0, 0.01)[:, np.newaxis]
y_1 = regr_1.predict(X_test)
y_2 = regr_2.predict(X_test)
# 图示结果
fig, ax = plt.subplots(figsize=(6,6), tight_layout=True)
ax.scatter(X, y, s=20, edgecolor="black", c="darkorange", label="data")
ax.plot(X_test, y_1, color="cornflowerblue", label="max_depth=2", linewidth=2)
ax.plot(X_test, y_2, color="yellowgreen", label="max_depth=5", linewidth=2)
ax.set_xlabel("data")
ax.set_ylabel("target")
ax.set_title("Decision Tree Regression")
ax.legend()
plt.show()
fig.savefig("../codeimage/code3.pdf")
```


Decision Tree Regression
data
max_depth=2
max_depth=5
target
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
0
1
2
3
4
5
data