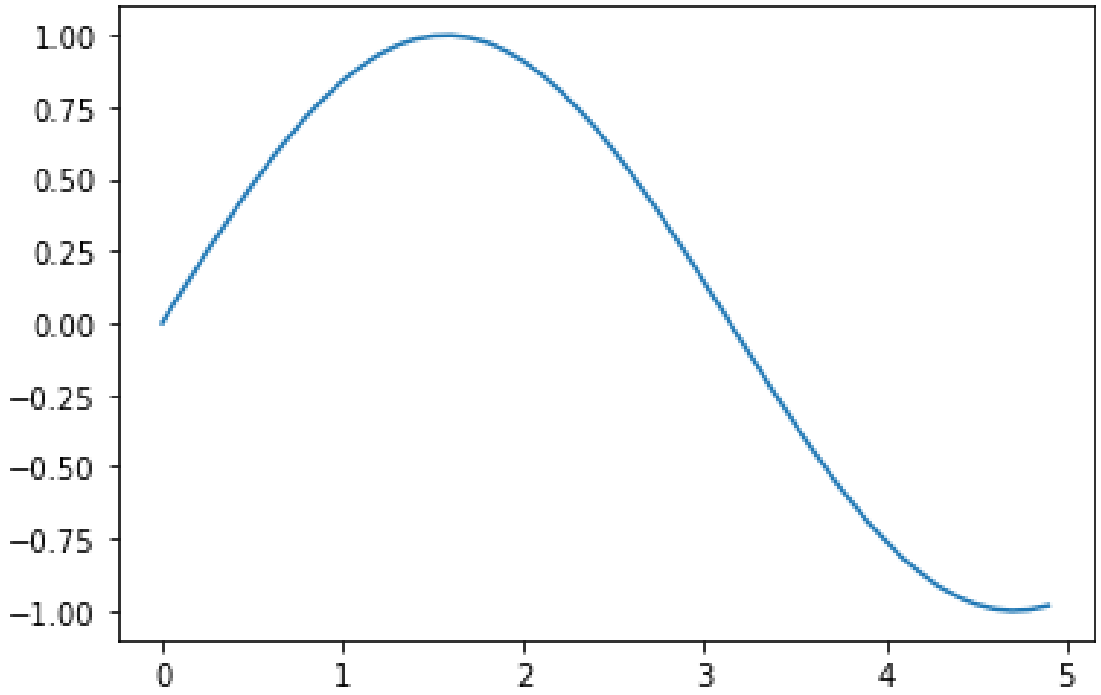
# Contents

```
import numpy as np
import matplotlib
#matplotlib.use('Agg')
import matplotlib.pyplot as plt

x = np.arange(0, 5, 0.1)
y = np.sin(x)
fig, ax = plt.subplots()
ax.plot(x, y)
#plt.savefig("fffffffffff")
```

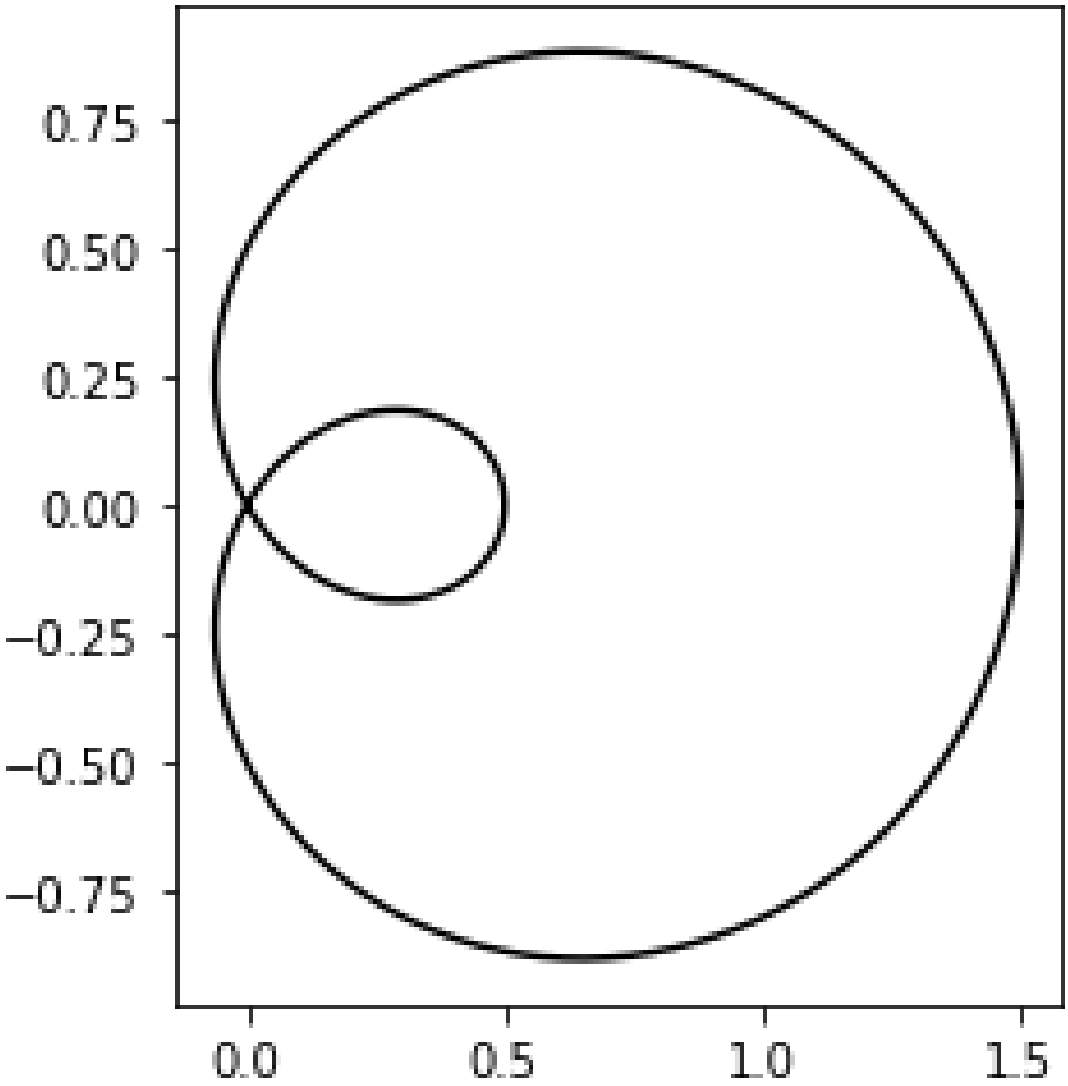
<matplotlib.lines.Line2D at 0x7feba26633d0>




```
import matplotlib, numpy
#matplotlib.use('Agg')
import matplotlib.pyplot as plt
fig=plt.figure(figsize=(4,2))
x=numpy.linspace(-15,15)
plt.plot(numpy.sin(x)/x)
#fig.tight_layout()
plt.savefig('images/python-matplot-fig.png')
#return 'images/python-matplot-fig.png' # return filename to org-mode
```

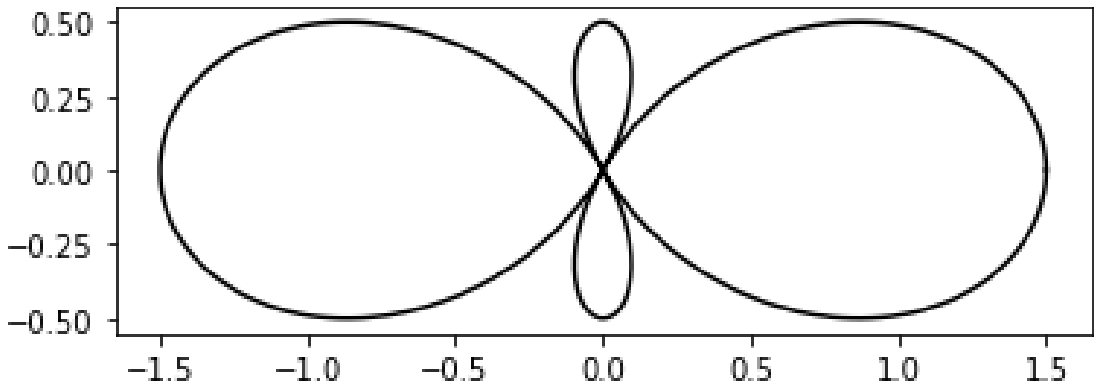
```
import numpy as np

import matplotlib.pyplot as plt
from matplotlib.path import Path
from matplotlib.patches import PathPatch

N = 400
t = np.linspace(0, 2 * np.pi, N)
```

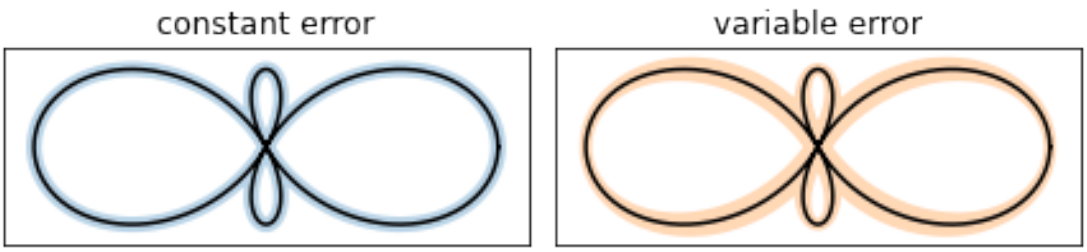
```
r = 0.5 + np.cos(t)
x, y = r * np.cos(t), r * np.sin(t)

fig, ax = plt.subplots()
ax.plot(x, y, "k")
ax.set(aspect=1)
```




```
import numpy as np

import matplotlib.pyplot as plt
from matplotlib.path import Path
from matplotlib.patches import PathPatch

N = 400
t = np.linspace(0, 2 * np.pi, N)
r = 0.5 + np.cos(2*t)
x, y = r * np.cos(t), r * np.sin(t)
```

```python

fig, ax = plt.subplots()
ax.plot(x, y, "k")
ax.set(aspect=1)

def draw_error_band(ax, x, y, err, **kwargs):
    # Calculate normals via centered finite differences (except the first point
    # which uses a forward difference and the last point which uses a backward
    # difference).
    dx = np.concatenate([[x[1] - x[0]], x[2:] - x[:-2], [x[-1] - x[-2]]])
    dy = np.concatenate([[y[1] - y[0]], y[2:] - y[:-2], [y[-1] - y[-2]]])
    l = np.hypot(dx, dy)
    nx = dy / l
    ny = -dx / l

    # end points of errors
    xp = x + nx * err
    yp = y + ny * err
    xn = x - nx * err
    yn = y - ny * err

    vertices = np.block([[xp, xn[::-1]],
                         [yp, yn[::-1]]]).T
    codes = np.full(len(vertices), Path.LINETO)
    codes[0] = codes[len(xp)] = Path.MOVETO
    path = Path(vertices, codes)
    ax.add_patch(PathPatch(path, **kwargs))


axs = (plt.figure(constrained_layout=True)
       .subplots(1, 2, sharex=True, sharey=True))
errs = [
    (axs[0], "constant error", 0.05),
    (axs[1], "variable error", 0.05 * np.sin(2 * t) ** 2 + 0.04),
]
for i, (ax, title, err) in enumerate(errs):
    ax.set(title=title, aspect=1, xticks=[], yticks=[])
    ax.plot(x, y, "k")
    draw_error_band(ax, x, y, err=err,
                    facecolor=f"C{i}", edgecolor="none", alpha=.3)

plt.show()
```




constant error
variable error