A picture is worth 1024 words

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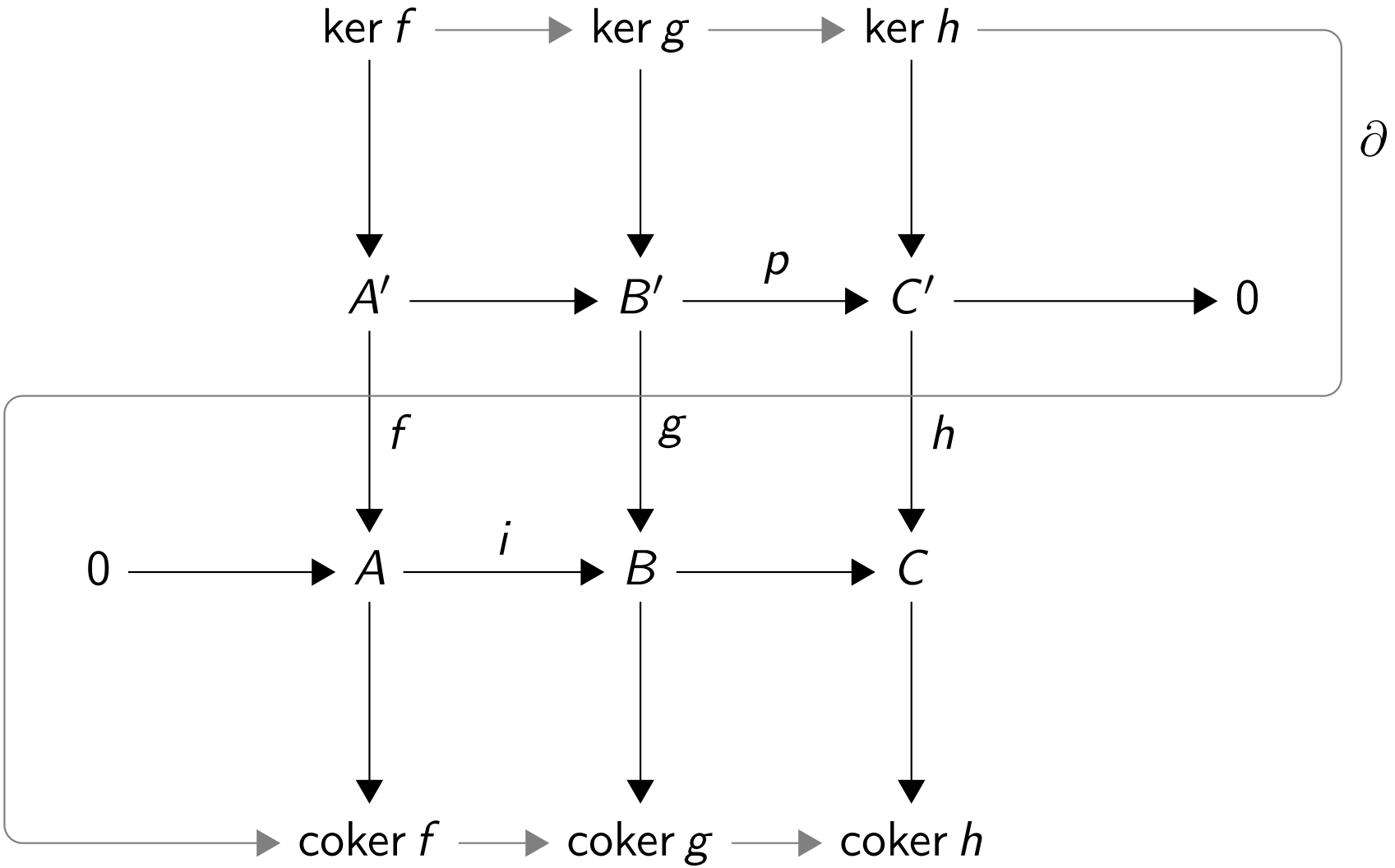
Diagrams and graphs

2D-plots

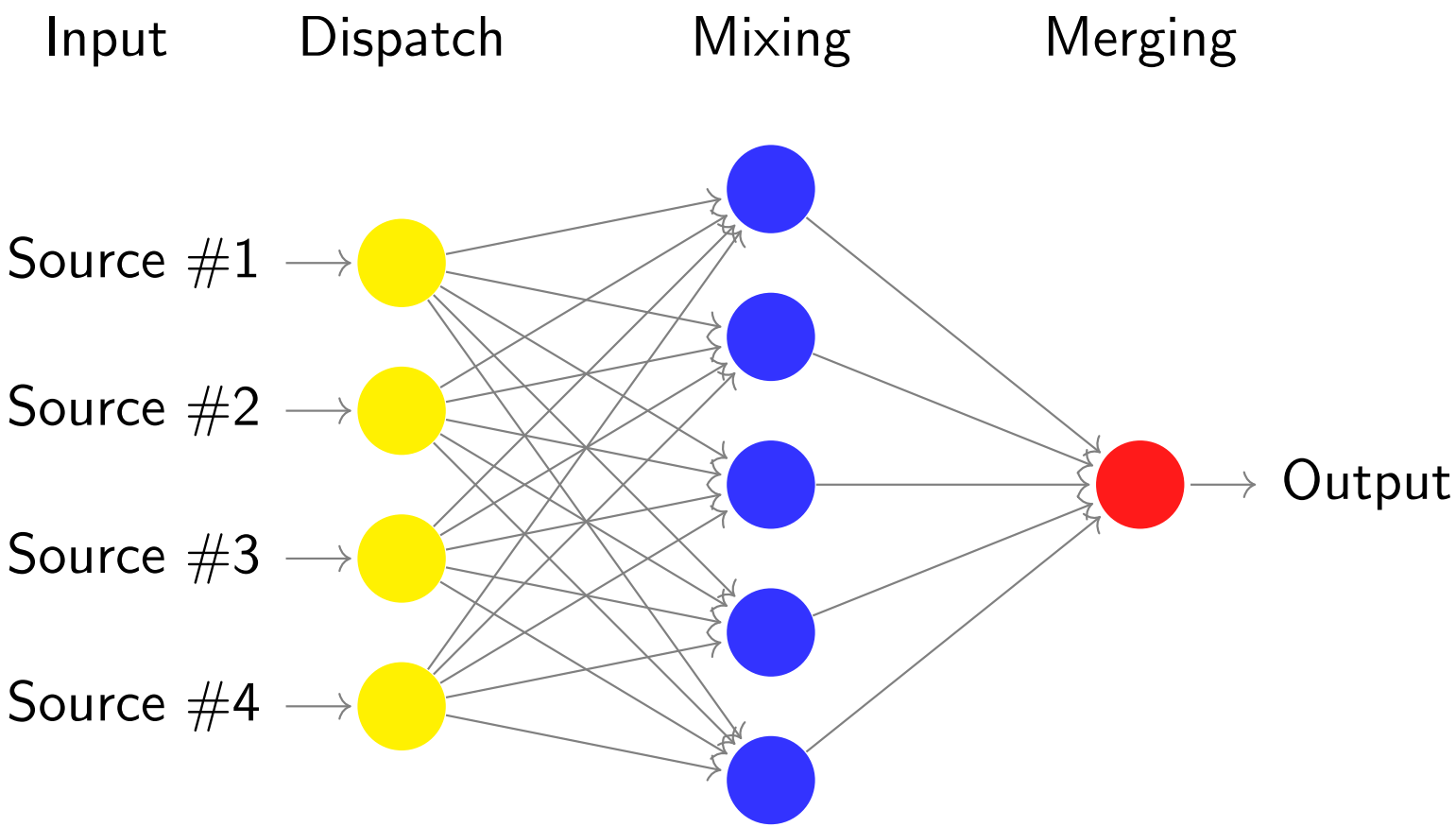
3D-plots

Including graphics

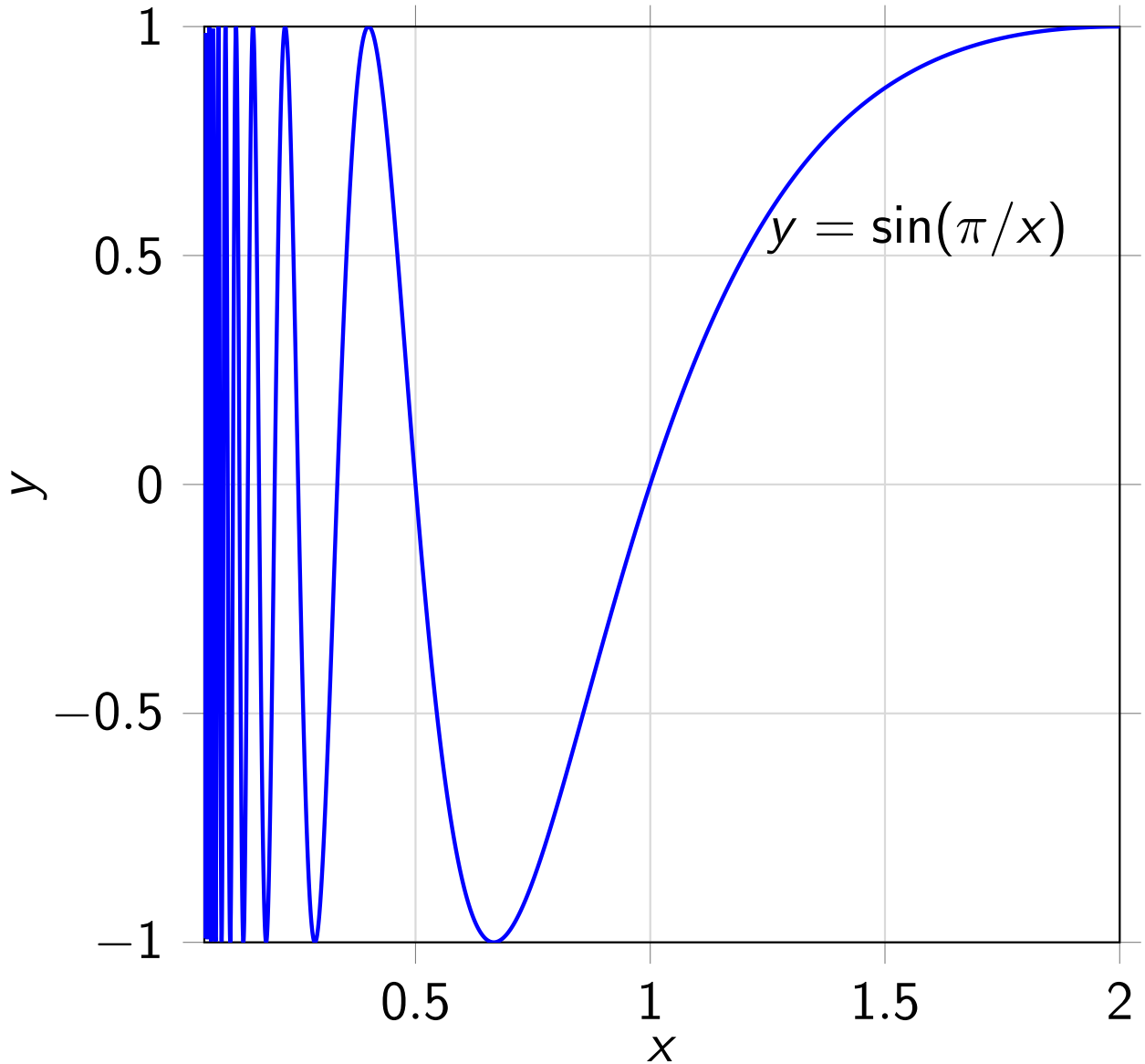
Commutative diagrams: The snake lemma with `tikz`



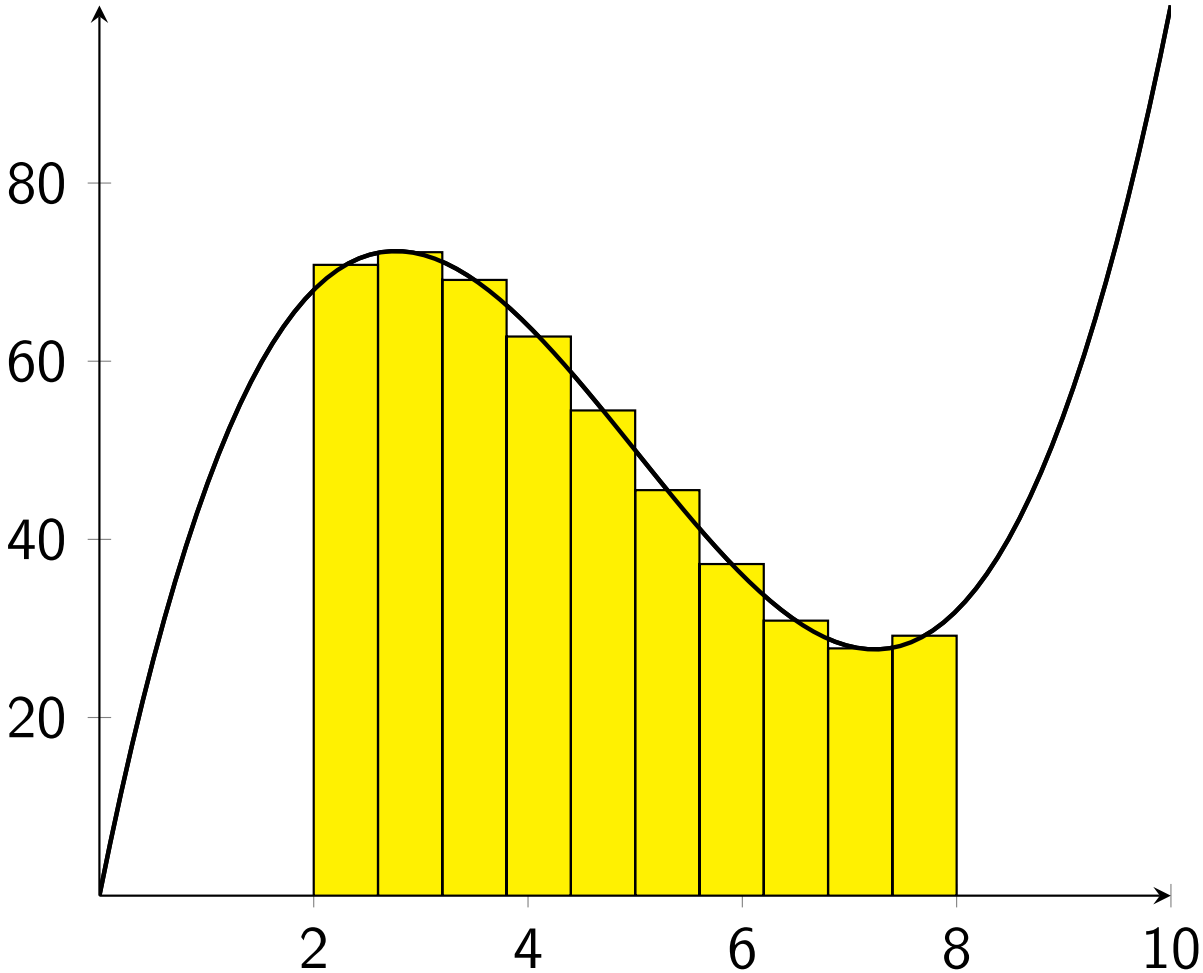
Graph flow diagram with `tikz`



Function plots with `pgfplots` and `tikz`



Riemann integral with pgfplots and tikz



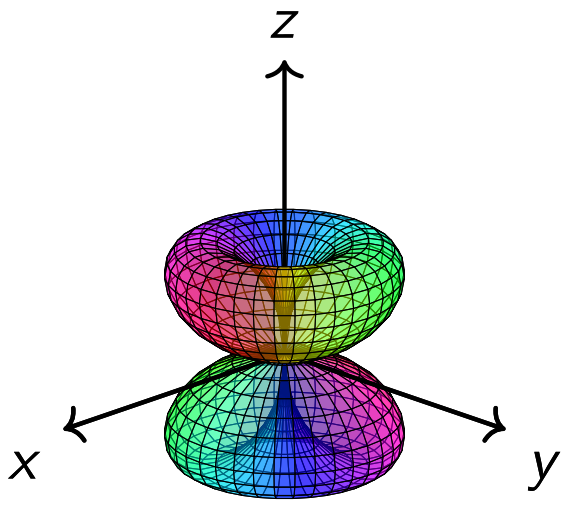
Spherical parametric surfaces with `tikz`

Syntax:

```
\tdplotsphericalsurfaceplot[fill color style]%
  {theta steps}{phi steps}%
  {function}{line color}{fill color}%
  {x axis}{y axis}{z axis}
```

The function is of the form $r = f(\theta, \phi)$ in spherical coordinates.

Parametric surface: color parametrization in ϕ

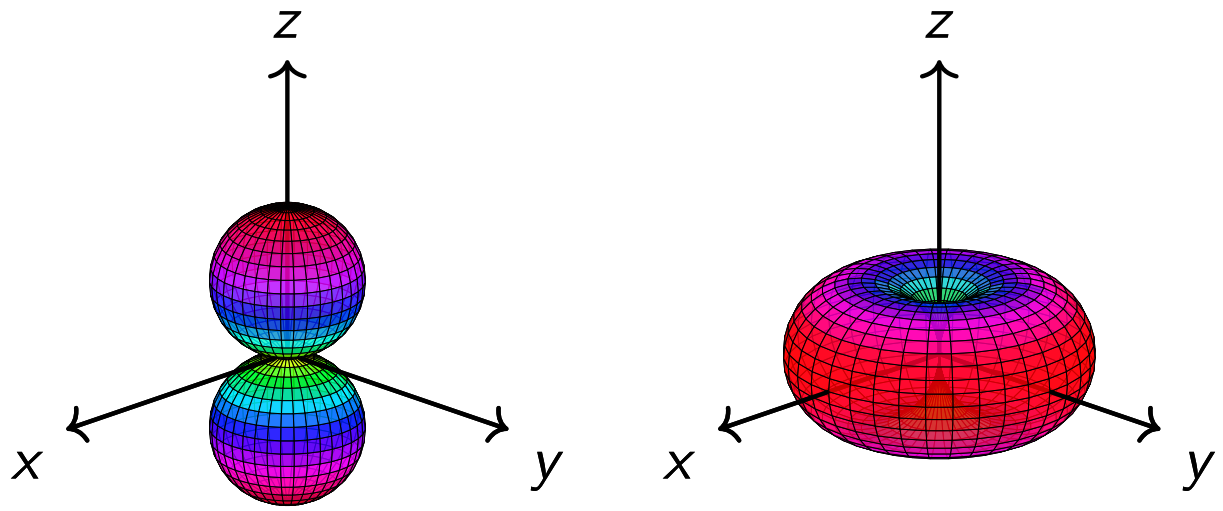


Parametric plot $r = \sin(\theta)\cos(\theta)$

Definition:

```
\tdplotsphericalsurfaceplot[parametricfill]{72}{36}%
  {sin(\tdplottheta)*cos(\tdplottheta)}{black}{\tdplotphi}%
  {\draw[color=black,thick,->] (0,0,0) -- (1,0,0)}%
  {\draw[color=black,thick,->] (0,0,0) -- (0,1,0)}%
  {\draw[color=black,thick,->] (0,0,0) -- (0,0,1)}
```

Parametric surface, color parametrization in *r*

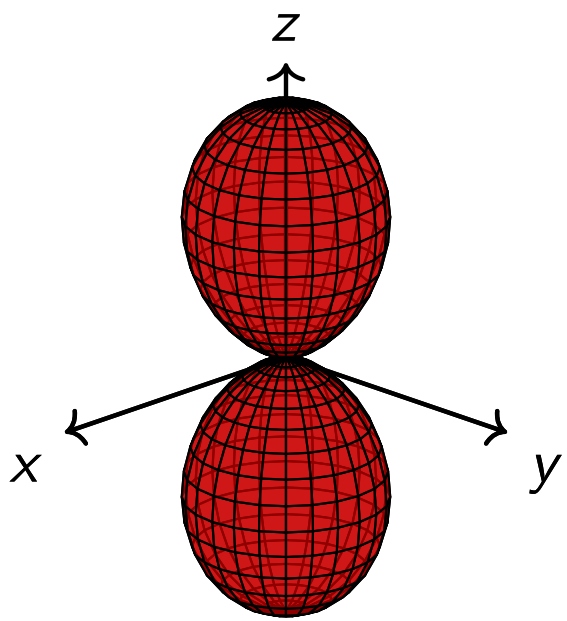


Plot of $r = 0.5\,|\cos(\theta)|$ Plot of $r = 0.5\,|\sin(\theta)|$

Definition:

```
\tdplotsphericalsurfaceplot[parametricfill]{72}{36}%
  {0.5*abs(cos(\tdplottheta))}{black}{2*abs(\tdplotr)}%
  {\draw[color=black,thick,->] (0,0,0) -- (1,0,0)}%
  {\draw[color=black,thick,->] (0,0,0) -- (0,1,0)}%
  {\draw[color=black,thick,->] (0,0,0) -- (0,0,1)}
```

Parametric surface, solid color

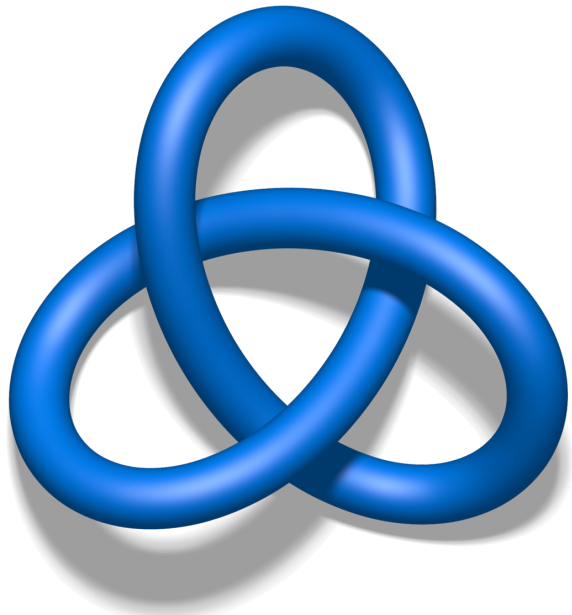


$$r = \frac{\sqrt{3}}{2}\cos(\theta)^2$$

Definition:

```
\tdplotsphericalsurfaceplot{72}{24}%
  {sqrt(3)/2*cos(\tdplottheta)^2}{black}{red!80!black}%
  {\draw[color=black,thick,->] (0,0,0) -- (1,0,0)}%
  {\draw[color=black,thick,->] (0,0,0) -- (0,1,0)}%
  {\draw[color=black,thick,->] (0,0,0) -- (0,0,1)}
```

Include graphics with graphix

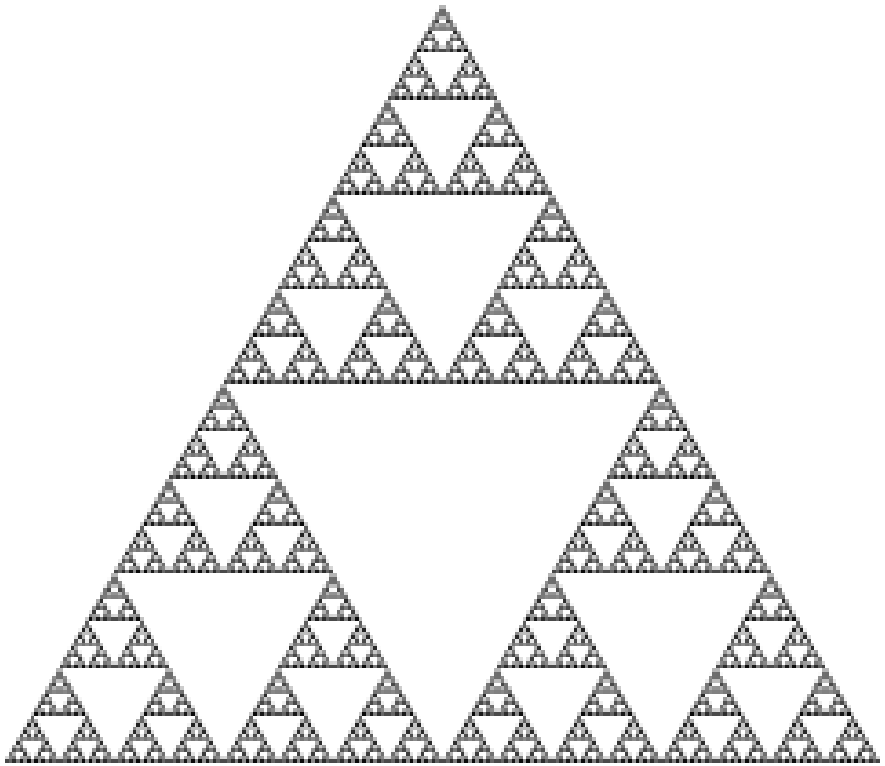


Trefoil knot from Wikimedia Commons

Syntax:

```
\includegraphics[scale=0.1]{img/TrefoilKnot.png}
```

Include graphics with graphix



Sierpinski triangle from Wikimedia Commons

Syntax:

```
\includegraphics[scale=0.66]{img/SierpinskiTriangle.png}
```