

A picture is worth 1024 words

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Marseille
21 January 2019

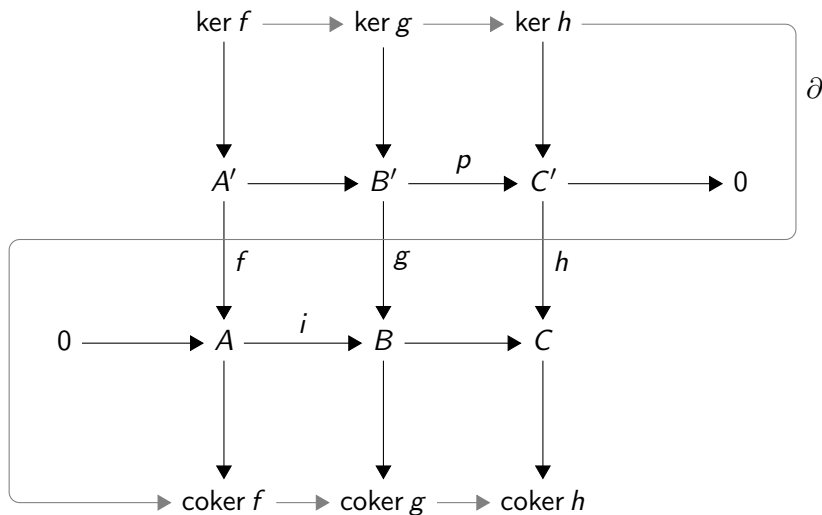
Diagrams and graphs

2D-plots

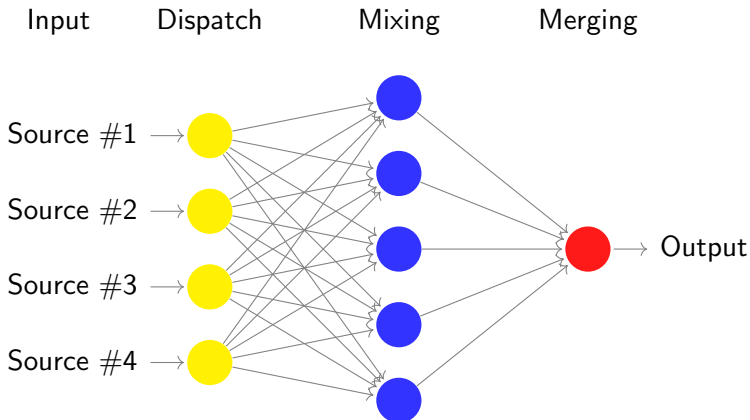
3D-plots

Including graphics

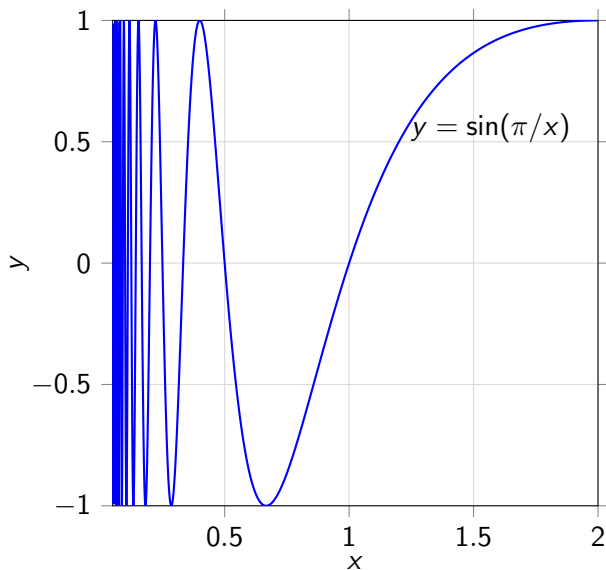
Commutative diagrams: The snake lemma with tikz



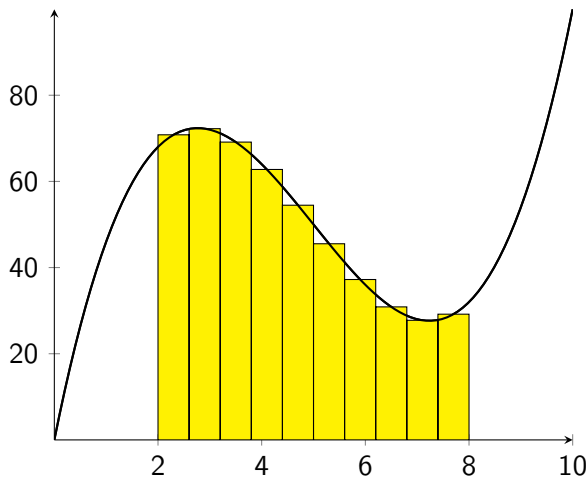
Graph flow diagram with tikz



Function plots with pgfplots and tikz



Riemann integral with pgfplots and tikz



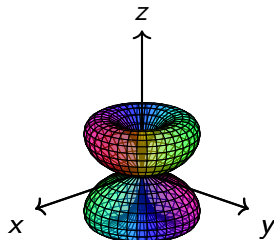
Spherical parametric surfaces with tikz

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

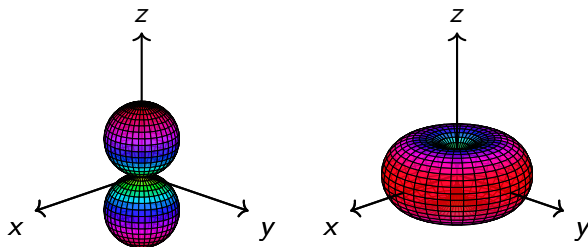


Parametric plot $r = \sin(\theta) \cos(\theta)$

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

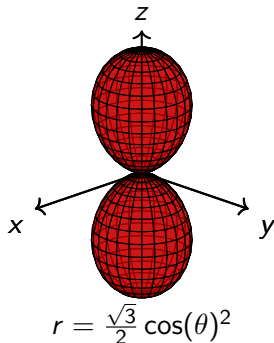


Plot of $r = 0.5 |\cos(\theta)|$ Plot of $r = 0.5 |\sin(\theta)|$

Definition:

```
\tdplotsphericalsurfaceplot[parametricfill]{72}{36}%
{0.5*abs(cos(\tdplottheta))}{black}{2*abs(\tdplottr)}%
{\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)}
```

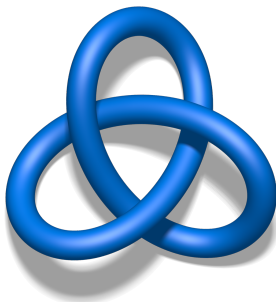
Parametric surface, solid color



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 `graphics`

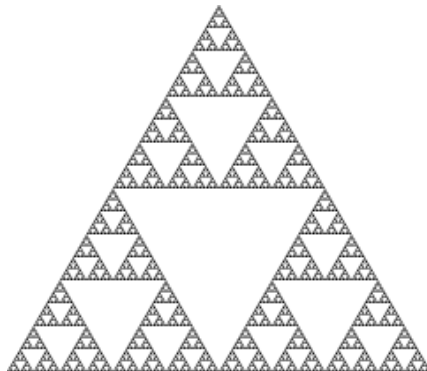


Trefoil knot from Wikimedia Commons

Syntax:

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

Include graphics with `graphics`



Sierpinski triangle from Wikimedia Commons

Syntax:

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