

```
f[x_] := Piecewise[{{ $\frac{2}{3}x - \frac{3}{13} 2\pi$ ,  $x < \frac{9}{13} 2\pi$ }, { $\frac{3}{2}(2\pi - x) - \frac{3}{13} 2\pi$ ,  $x \geq \frac{9}{13} 2\pi$ }}, 0];
```

```
f[x]
```

```
Plot[f[x], {x, 0, 2 Pi}, AspectRatio -> Automatic]
```

```
MaxValue[f[x], x]
```

```
StereoGraphicProjection[{x_, y_, z_, w_}] := {x/1-w, y/1-w, z/1-w}
```

```
knot = ParametricPlot3D[
  {{Sin[ $\frac{3\theta}{2}$ ], Cos[ $\frac{3\theta}{2}$ ],  $\frac{2n\pi}{3} + \theta$ }, {-Sin[ $\frac{3\theta}{2}$ ], -Cos[ $\frac{3\theta}{2}$ ],  $\frac{2n\pi}{3} + \theta$ }} /. n -> 0,
  {theta, 0, 2 Pi}, PlotStyle -> {Thick, Blue}]
```

```
ParametricPlot3D[{r Cos[theta], r Sin[theta], Abs[r Exp[I theta]]^5 f[Pi + Arg[(r Exp[I theta])^2]]},
  {r, 0, 1}, {theta, 0, 2 Pi}, PlotRange -> All, Exclusions -> None, PlotPoints -> 20]
```

```
Show[knot, ParametricPlot3D[
  {r Sin[theta + Pi/2], r Cos[theta + Pi/2], Pi/3 + Abs[r Exp[I theta]]^3 f[Pi + Arg[(r Exp[I theta])^2]]},
  {r, 0, 1}, {theta, 0, 2 Pi}, PlotRange -> All, Exclusions -> None, PlotPoints -> 20]]
```

```
{r Sin[theta], r Cos[theta],  $\pi n + \frac{1}{3} \text{Abs}[x + i y]^3 \text{Arg}[\text{Exp}[n I \pi] (x + i y)^2]$  /. {x -> Cos[theta], y -> Sin[theta]}
```

```
Show[knot, ParametricPlot3D[{r Sin[theta], r Cos[theta],
   $\pi n + \frac{1}{3} \text{Abs}[r \text{Exp}[I \theta]]^3 \text{Arg}[(r \text{Exp}[n \pi + I \theta])^2]$  /. {n -> 0}}, {r, 0, 1}, {theta, 0, 2 Pi}]]
```

```
Plot[ $\pi n + \frac{1}{3} \text{Abs}[r \text{Exp}[I \theta]]^3 \text{Arg}[(r \text{Exp}[n \pi + I \theta])^2]$  /. {n -> 0, r -> 1}, {theta, 0, 2 Pi}]
```

```
 $\tau \text{Arg} := \text{Mod}[\text{Arg}[\#], 2 \pi] \&$ 
```

```
g[x_, n_ : 0] := Piecewise[{{
   $\frac{2}{3}x + n 2\pi/3$ ,  $0 < x \leq \pi/2$ },
   $-\frac{2}{3}(x - \pi/2) + \pi/3 + n 2\pi/3$ ,  $\pi/2 < x \leq \pi$ },
   $\frac{2}{3}(x - \pi) + n 2\pi/3$ ,  $\pi < x \leq 3\pi/2$ },
   $-\frac{2}{3}(x - 3/2\pi) + \pi/3 + n 2\pi/3$ ,  $3\pi/2 < x \leq 2\pi$ }
  ]]
```

```
Plot[{g[x, 0], g[x, 1], g[x, 2]}, {x, 0, 2 Pi}, PlotRange -> {{0, 2 Pi}, {0, 2 Pi}}]
```

```
g2[x_, n_] := g[x, n] - Pi/6
```

```
Plot[{g2[x, 0], g2[x, 1], g2[x, 2], g2[x, 3]}, {x, 0, 2 Pi}, PlotRange -> {{0, 2 Pi}, {0, 2 Pi}}]
```

```

h[x_, n_ : 0] := Piecewise[{
  {-3/2 x + π + n π, 0 < x ≤ π/3},
  {3/2 (x - π/3) + π/2 + n π, π/3 < x ≤ 2 π/3},
  {-3/2 (x - 2 π/3) + π + n π, 2 π/3 < x ≤ 3 π/3},
  {3/2 (x - 3 π/3) + π/2 + n π, 3 π/3 < x ≤ 4 π/3},
  {-3/2 (x - 4 π/3) + π + n π, 4 π/3 < x ≤ 5 π/3},
  {3/2 (x - 5 π/3) + π/2 + n π, 5 π/3 < x ≤ 6 π/3}
}]
h2[x_, n_] := h[x, n] - π/6
Plot[{h[x, 0], h[x, 1]}, {x, 0, 2 Pi}, PlotRange → {{0, 2 π}, {0, 2 π}}]
Show[knot, ParametricPlot3D[Table[{r Cos[θ + π/2], r Sin[θ + π/2],
  Abs[r Exp[I θ]]^4 g[Arg[r Exp[I θ]], 0] + 2 π n/3}, {n, 0, 2}], {r, 0, 1},
{θ, 0, 2 π}, Mesh → None, PlotRange → All, Exclusions → None, PlotPoints → 40]]
Show[knot, ParametricPlot3D[Table[{r Cos[θ - π/4], r Sin[θ - π/4],
  Abs[r Exp[I θ]]^4 g2[Arg[r Exp[I θ]], 0] + 2 π n/3}, {n, 0, 3}], {r, 0, 1},
{θ, 0, 2 π}, Mesh → None, PlotRange → All, Exclusions → None, PlotPoints → 40]]
Show[knot, ParametricPlot3D[Table[
  {r Cos[θ + π/2], r Sin[θ + π/2], Abs[r Exp[I θ]]^4 h[Arg[r Exp[I θ]], 0] + n π}, {n, 0, 1}],
{r, 0, 1}, {θ, 0, 2 π}, Mesh → None, PlotRange → All, Exclusions → None, PlotPoints → 40]]
Show[knot, ParametricPlot3D[Table[
  {r Cos[θ + π/2], r Sin[θ + π/2], Abs[r Exp[I θ]]^4 h[Arg[r Exp[I θ]], 0] + n π}, {n, 0, 1}],
{r, 0, 1}, {θ, 0, 2 π}, Mesh → None, PlotRange → All, Exclusions → None, PlotPoints → 40]]

```