In [1]:

```
G := E^y*Sin[t] - y + 1;
f=-D[G,t]/D[G,y]
```

Out[2]:

$$-\frac{e^{y}\,\mathrm{Cos}[t]}{-1+e^{y}\,\mathrm{Sin}[t]}$$

这里利用了隐函数存在定理:

$$\frac{dy}{dx}=-\frac{F_x}{F_y}$$

In [7]:

```
FactorInteger[2^2^5 + 1]
```

Out[7]:

```
{{641, 1}, {6700417, 1}}
```

In [6]:

```
(6700417*641)==(2^2^5 + 1)
```

Out[6]:

```
True
```

FactorInteger表示整数因子分解,所选示例为经典费马数,分解形式为$\{p_k, a_k\}$,前者表示素因子,后者表示其指数

In [3]:

```
N[E,200]
```

Out[3]:

```
2.71828182845904523536028747135266249775724709369995957496696762772407
663035354759457138\

>   21785251664274274663919320030599218174135966290435729003342952605956
3073813232862794\

>   34907632338298807531952510190
```

表示给出自然常数E的200位精度的数值值,\>为续行

In [10]:

```
Expand[(a + b)^3]
Factor[x^3 + y^3 + z^3 - 3 x y z]
```

Out[10]:

$$a^3 + 3a^2b + 3ab^2 + b^3$$
$$(x + y + z)\left(x^2 - xy + y^2 - xz - yz + z^2\right)$$

In [12]:

```
Solve[x^3 - 2 x - 1 == 0, x]
```

Out[12]:

$$\left\{\{x \to -1\}, \left\{x \to \frac{1}{2}\left(1 - \sqrt{5}\right)\right\}, \left\{x \to \frac{1}{2}\left(1 + \sqrt{5}\right)\right\}\right\}$$

In [13]:

```
Limit[(Tan[x] - x)/(x - Sin[x]), x -> 0]
D[x^x, x]
Integrate[x^2 Cos[x], x]
```

Out[13]:

$$2$$
$$x^x\,(1 + \text{Log}[x])$$
$$2x\,\text{Cos}[x] + \left(-2 + x^2\right)\text{Sin}[x]$$

In [16]:

```
Sum[x^(2 n)/(n^2 Binomial[2 n, n]), {n, Infinity}]
```

Out[16]:

$$2\,\text{ArcSin}\left[\frac{x}{2}\right]^2$$

In [17]:

```
FullSimplify[DSolve[y''[x] + y[x] == 8 x Sin[x], y[x], x]]
```

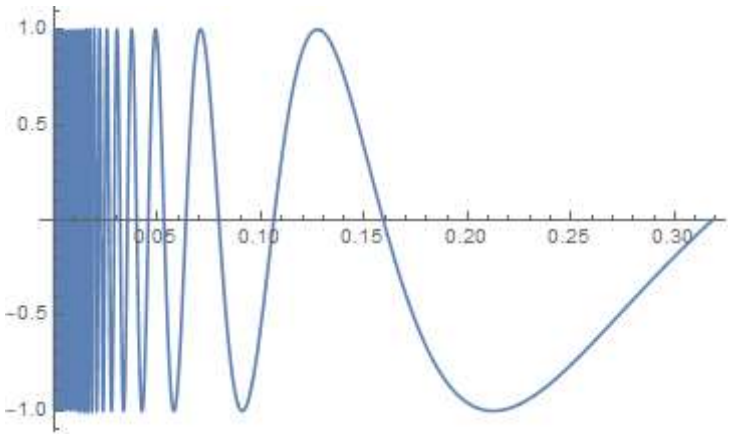
Out[17]:

$$\left\{\left\{y[x] \to \left(1 - 2x^2 + C[1]\right)\text{Cos}[x] + (2x + C[2])\,\text{Sin}[x]\right\}\right\}$$

In [18]:

```
Plot[Sin[1/x], {x, 0, 1/Pi}, PlotPoints -> 1000]
```

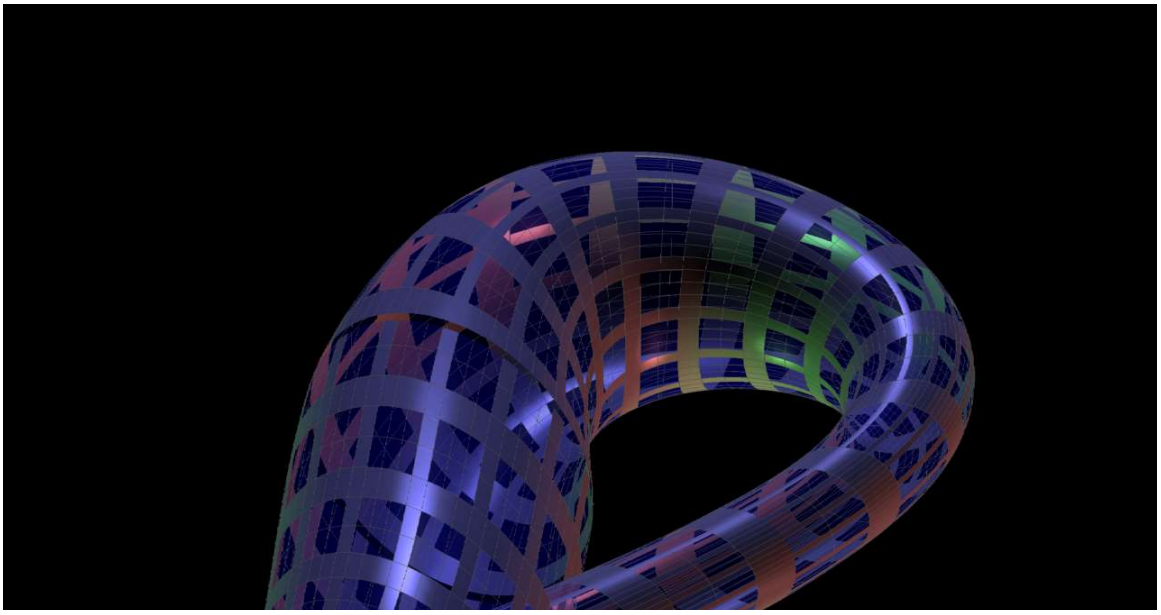
Out[18]:



In [19]:

```
bx = 6*Cos[u]*(1 + Sin[u]); by = 16*Sin[u]; rad = 4*(1 - Cos[u]/2);
X = If[Inequality[Pi, Less, u, LessEqual, 2*Pi], bx + rad*Cos[v + Pi],
    bx + rad*Cos[u]*Cos[v]];
Y = If[Inequality[Pi, Less, u, LessEqual, 2*Pi], by,
   by + rad*Sin[u]*Cos[v]];
Z = rad*Sin[v];
o = 0.2; col1 = Blue; col2 = Gray;
darklights = {{"Directional", RGBColor[0.5, 0.5, 1],
    ImageScaled[{0, 1, 0}]},
        {"Directional", RGBColor[1, 0.5, 0.5],
    ImageScaled[{1, -1, 0}]}, {"Directional", RGBColor[0.5, 1, 0.5],
    ImageScaled[{-1, -1, 0}]}};
gr = ParametricPlot3D[{X, Y, Z}, {u, 0, 2*Pi}, {v, 0, 2*Pi},
  PlotPoints -> {48, 12}, Axes -> False, Boxed -> False, Mesh -> 59,
  MeshShading -> {{{col1, Opacity[o], Specularity[White, 128]}, {col1,
       Opacity[o], Specularity[White, 128]}, {col2,
      Specularity[White, 128]}}, {{col1, Opacity[o],
      Specularity[White, 128]}, {col1, Opacity[o],
      Specularity[White, 128]}, {col2,
      Specularity[White, 128]}}, {{col1, Opacity[o],
      Specularity[White, 128]}, {col1, Opacity[o],
      Specularity[White, 128]}, {col2,
      Specularity[White, 128]}}, {{col2,
      Specularity[White, 128]}, {col2,
      Specularity[White, 128]}, {col2, Specularity[White, 128]}}},
  MeshStyle -> GrayLevel[.3], ImageSize -> {1280, 1024},
  MeshFunctions -> {#4 &, #5 &}, Background -> Black,
  Lighting -> darklights, SphericalRegion -> True,
  ViewAngle -> \[Pi]/12]
```

Out[25]:



In [27]:

```
Sound[SoundNote[##, "Piano"] & @@@
   Transpose[{{"B", "B", "C5", "D5", "D5", "C5", "B", "A", "G", "G",
      "A", "B", "B", "A", "A", "B", "B", "C5", "D5", "D5", "C5", "B",
      "A", "G", "G", "A", "B", "A", "G", "G", "A", "A", "B", "G", "A",
      "B", "C5", "B", "G", "A", "B", "C5", "B", "A", "G", "A", "D",
      "B", "B", "B", "C5", "D5", "D5", "C5", "B", "A", "G", "G", "A",
      "B", "A", "G", "G"}, {0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5,
      0.5, 0.5, 0.5, 0.5, 0.75, 0.25, 1, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5,
      0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.75, 0.25, 1, 0.5, 0.5, 0.5,
      0.5, 0.5, 0.25, 0.25, 0.5, 0.5, 0.5, 0.25, 0.25, 0.5, 0.5, 0.5,
      0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5,
      0.5, 0.5, 0.75, 0.25, 1}}]] // EmitSound
```

In [30]:

```
M74 =
Import[
  "http://www.nasa.gov/images/content/202918main_hstimg_20071129_m74.jpg"]
```

Out[30]:

In [31]:

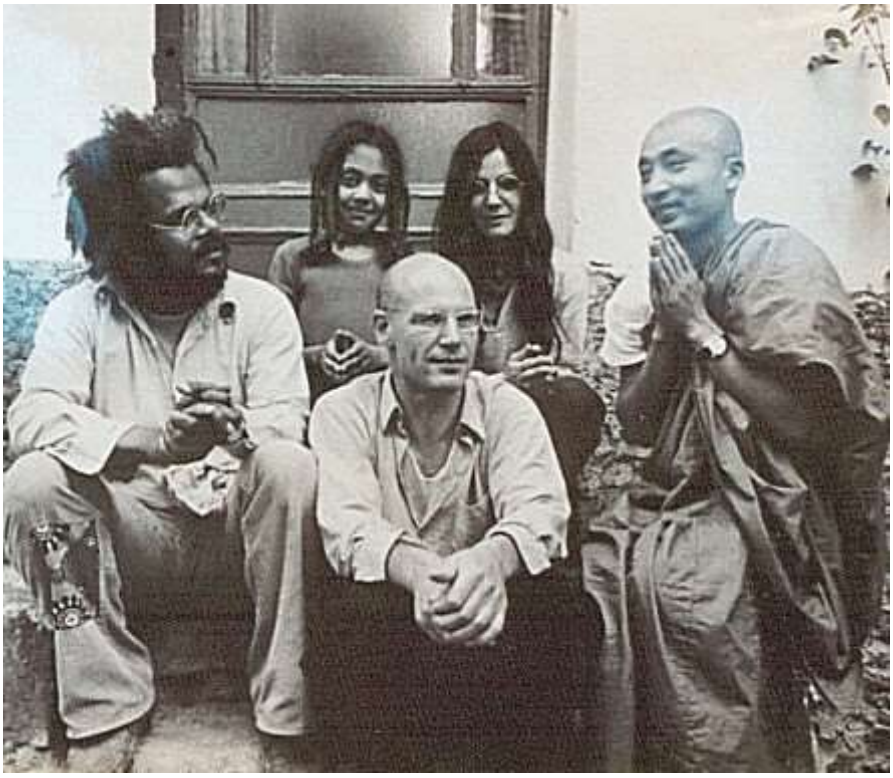
```
ImageEffect[M74, {"OilPainting", 6}]
```

Out[31]:

In [32]:

```
Grothendieck =
 Import["http://farm1.staticflickr.com/35/103000621_bcaee4a234.jpg"]
```

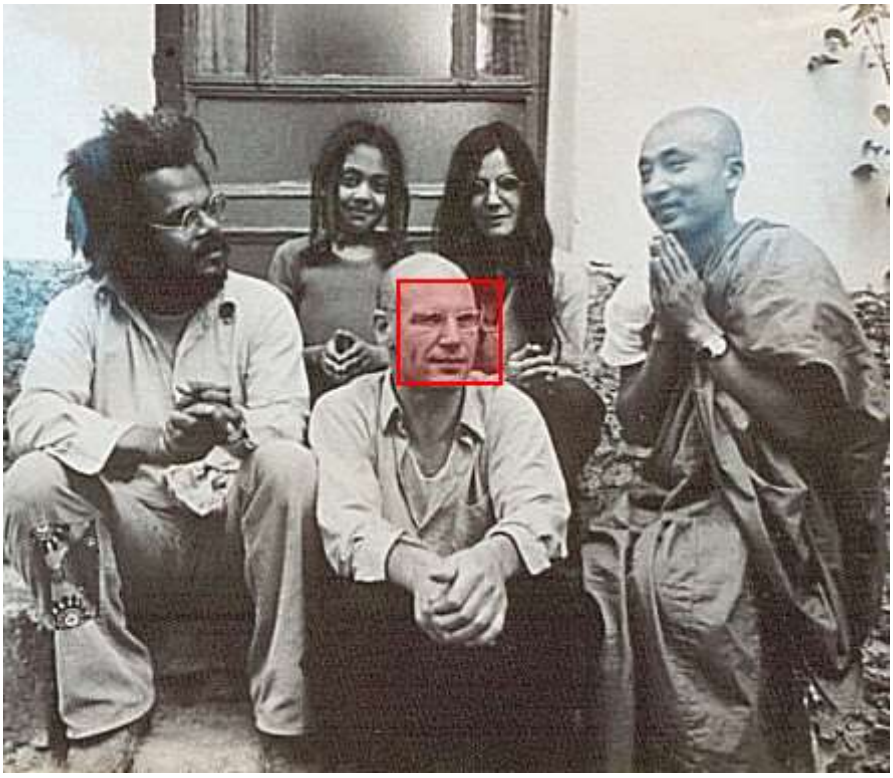
Out[32]:



In [33]:

```
HighlightImage[Grothendieck, FindFaces[Grothendieck][[2]]]
```

Out[33]:



In [34]:

```
FinancialData["JD"]
DateListPlot[FinancialData["JD", {"Jan. 1, 2020", "Jul. 31, 2021"}]]
```

Out[34]: