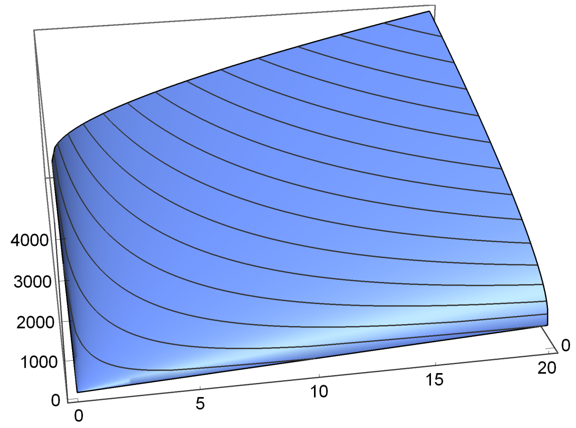
Tipo CES

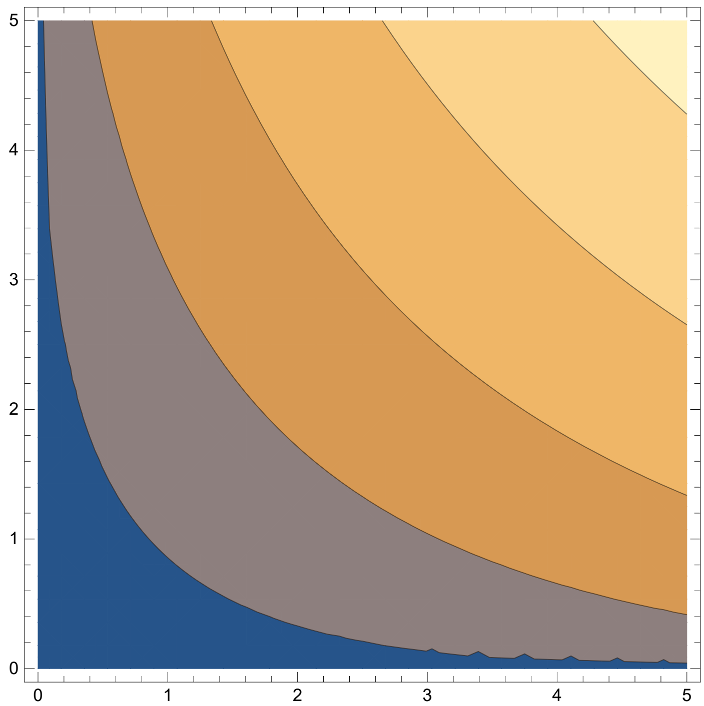
```
U = (3 * X^(1/3) + 3 * Y^(1/3)) ^3
```

$$\left(3\, X^{1/3} + 3\, Y^{1/3}\right)^3$$

```
Plot3D[U, {X, 0, 20}, {Y, 0, 20},
 PlotPoints → 100, MaxRecursion → 10, PlotTheme → "Business"]
```




```
ContourPlot[U, {X, 0, 5}, {Y, 0, 5}]
```




```
H = {{∂X,X U, ∂X,Y U}, {∂Y,X U, ∂Y,Y U}}
```

$$\left\{\left\{\frac{6\left(3\, X^{1/3} + 3\, Y^{1/3}\right)}{X^{4/3}} - \frac{2\left(3\, X^{1/3} + 3\, Y^{1/3}\right)^2}{X^{5/3}}, \frac{6\left(3\, X^{1/3} + 3\, Y^{1/3}\right)}{X^{2/3}\, Y^{2/3}}\right\},\right.$$

$$\left.\left\{\frac{6\left(3\, X^{1/3} + 3\, Y^{1/3}\right)}{X^{2/3}\, Y^{2/3}}, -\frac{2\left(3\, X^{1/3} + 3\, Y^{1/3}\right)^2}{Y^{5/3}} + \frac{6\left(3\, X^{1/3} + 3\, Y^{1/3}\right)}{Y^{4/3}}\right\}\right\}$$

MatrixForm[H]

$$\begin{pmatrix} \frac{6\left(3X^{1/3}+3Y^{1/3}\right)}{X^{4/3}} - \frac{2\left(3X^{1/3}+3Y^{1/3}\right)^2}{X^{5/3}} & \frac{6\left(3X^{1/3}+3Y^{1/3}\right)}{X^{2/3}Y^{2/3}} \\ \frac{6\left(3X^{1/3}+3Y^{1/3}\right)}{X^{2/3}Y^{2/3}} & -\frac{2\left(3X^{1/3}+3Y^{1/3}\right)^2}{Y^{5/3}} + \frac{6\left(3X^{1/3}+3Y^{1/3}\right)}{Y^{4/3}} \end{pmatrix}$$

Eigenvalues[H]

$$\left\{0, \left(\frac{18}{X^{4/3}\,Y^{5/3}} + \frac{18}{X^{5/3}\,Y^{4/3}}\right)\left(-X^2 - Y^2\right)\right\}$$

Δ = **Det[H]**

0

$$\mathbf{H1} = \frac{6\left(3X^{1/3}+3Y^{1/3}\right)}{X^{4/3}} - \frac{2\left(3X^{1/3}+3Y^{1/3}\right)^2}{X^{5/3}} = \frac{-18\left(X^{1/3}+Y^{1/3}\right)Y^{1/3}}{X^{5/3}} < 0$$

Is H negative semi definite? Is U quasi concave?