

In[81]:= **f = (x + y + 1) / Sqrt[x^2 + y^2 + 1]**

$$\text{Out[81]} = \frac{1 + x + y}{\sqrt{1 + x^2 + y^2}}$$

In[82]:= **gradijent = D[f, {{x, y}}]**

$$\text{Out[82]} = \left\{ -\frac{x(1+x+y)}{(1+x^2+y^2)^{3/2}} + \frac{1}{\sqrt{1+x^2+y^2}}, -\frac{y(1+x+y)}{(1+x^2+y^2)^{3/2}} + \frac{1}{\sqrt{1+x^2+y^2}} \right\}$$

In[83]:= **Tacke = Solve[gradijent == 0, {x, y}]**

Out[83]= {{x -> 1, y -> 1}}

In[84]:= **Hodf = Simplify[D[f, {{x, y}, 2}]]**

$$\text{Out[84]} = \left\{ \left\{ \frac{-1 - y - y^2 - y^3 + 2x^2(1+y) - 3x(1+y^2)}{(1+x^2+y^2)^{5/2}}, \frac{-x^3 + 2x^2y - y(1+y^2) + x(-1 + 3y + 2y^2)}{(1+x^2+y^2)^{5/2}} \right\}, \right. \\ \left. \left\{ \frac{-x^3 + 2x^2y - y(1+y^2) + x(-1 + 3y + 2y^2)}{(1+x^2+y^2)^{5/2}}, \right. \right. \\ \left. \left. \frac{-1 - x^3 - 3y + 2y^2 - x^2(1 + 3y) + x(-1 + 2y^2)}{(1+x^2+y^2)^{5/2}} \right\} \right\}$$

In[85]:= **HodfM = MatrixForm[Hodf]**

Out[85]/MatrixForm=

$$\begin{pmatrix} \frac{-1-y-y^2-y^3+2x^2(1+y)-3x(1+y^2)}{(1+x^2+y^2)^{5/2}} & \frac{-x^3+2x^2y-y(1+y^2)+x(-1+3y+2y^2)}{(1+x^2+y^2)^{5/2}} \\ \frac{-x^3+2x^2y-y(1+y^2)+x(-1+3y+2y^2)}{(1+x^2+y^2)^{5/2}} & \frac{-1-x^3-3y+2y^2-x^2(1+3y)+x(-1+2y^2)}{(1+x^2+y^2)^{5/2}} \end{pmatrix}$$

In[86]:= **HodfuTacke = Hodf /. Tacke**

$$\text{Out[86]} = \left\{ \left\{ \left\{ -\frac{2}{3\sqrt{3}}, \frac{1}{3\sqrt{3}} \right\}, \left\{ \frac{1}{3\sqrt{3}}, -\frac{2}{3\sqrt{3}} \right\} \right\} \right\}$$

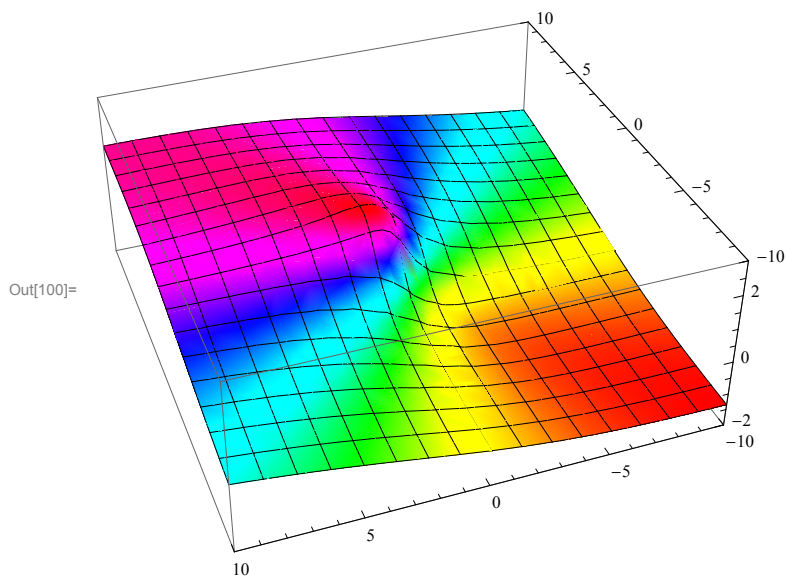
In[87]:= **minf = Map[PositiveDefiniteMatrixQ, HodfuTacke, 1]**

Out[87]= {False}

In[88]:= **maxf = Map[PositiveDefiniteMatrixQ, -HodfuTacke, 1]**

Out[88]= {True}

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In[100]:= Plot3D[f, {x, -10, 10}, {y, -10, 10},  
ColorFunction -> Hue, PlotRange -> {{-10, 10}, {-10, 10}, {-2, 3}}]
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In[101]:= Show[%100, ImageSize -> Full]
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