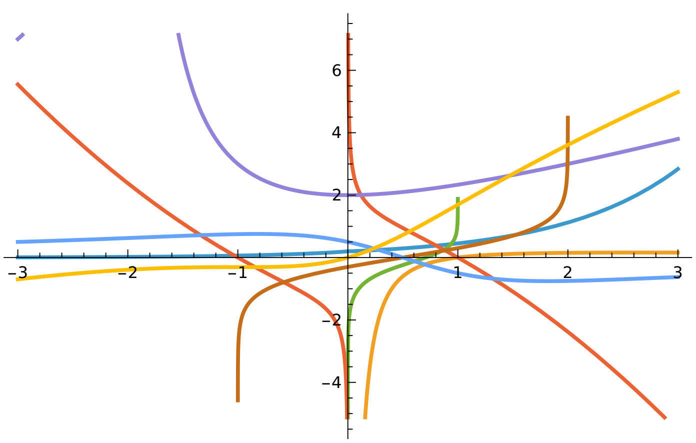
In[1]:=
```
(*
LogPlot[]
LogLogPlot[]
LogLinearPlot[]
*)
```

In[2]:=
```
f1[x_] := (Exp[x] / (Surd[x ^ 2, 3] + 5))
f2[x_] := Log10[x] / x
f3[x_] := Log10[x / Sqrt[1 - x ^ 2]]
f4[x_] := (1 - x ^ 2) / (Surd[x, 3])
f5[x_] := Abs[x + (4 / (x + 2))]
f6[x_] := Log10[(1 + x) / (2 - x)]
f7[x_] := (1 - 2 x) / (x ^ 2 - x + 2)
f8[x_] := x + Log[x ^ 2 + 1]
```

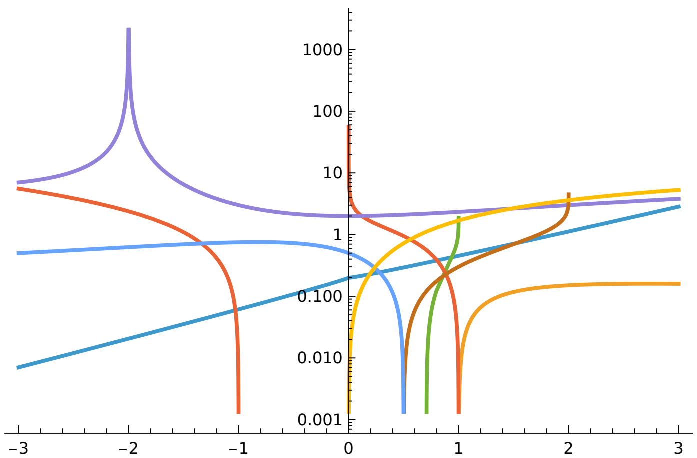
In[10]:=
```
Plot[
{
f1[x],
f2[x],
f3[x],
f4[x],
f5[x],
f6[x],
f7[x],
f8[x],
},
{x, -3, 3}
]
```

Out[10]=



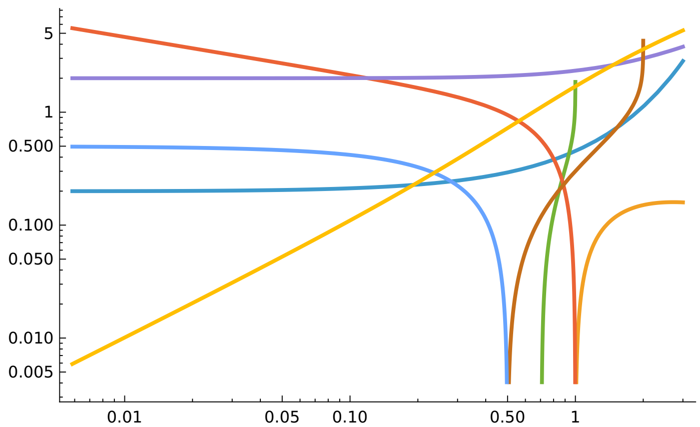
In[11]:=
```
LogPlot[
{
f1[x],
f2[x],
f3[x],
f4[x],
f5[x],
f6[x],
f7[x],
f8[x],
},
{x, -3, 3}
]
```

Out[11]=



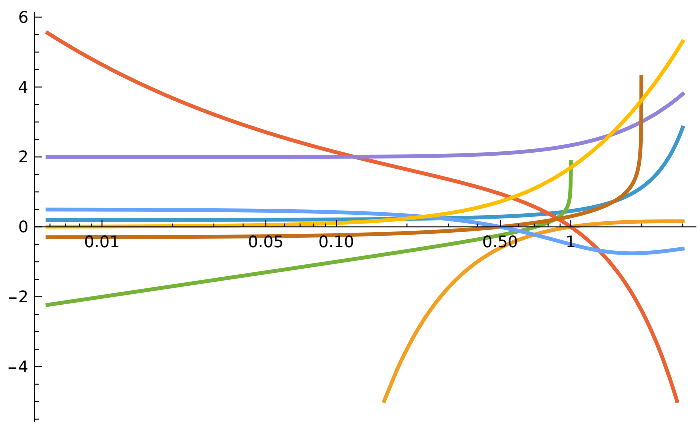
In[12]:=
```
LogLogPlot[
{
f1[x],
f2[x],
f3[x],
f4[x],
f5[x],
f6[x],
f7[x],
f8[x],
},
{x, -3, 3}
]
```

Out[12]=



In[13]:=
```
LogLinearPlot[
{
f1[x],
f2[x],
f3[x],
f4[x],
f5[x],
f6[x],
f7[x],
f8[x],
},
{x, -3, 3}
]
```

Out[13]=



In[14]:=
```
f1'[x]
f2'[x]
f3'[x]
f4'[x]
f5'[x]
f6'[x]
f7'[x]
f8'[x]
```

Out[14]=

$$-\frac{2\,e^{x}\,x}{3\,\sqrt[3]{x^{2}}^{2}\left(5+\sqrt[3]{x^{2}}\right)^{2}}+\frac{e^{x}}{5+\sqrt[3]{x^{2}}}$$

Out[15]=

$$\frac{1}{x^{2}\,\text{Log}[10]}-\frac{\text{Log}[x]}{x^{2}\,\text{Log}[10]}$$

Out[16]=

$$\frac{\sqrt{1-x^{2}}\left(\frac{x^{2}}{(1-x^{2})^{3/2}}+\frac{1}{\sqrt{1-x^{2}}}\right)}{x\,\text{Log}[10]}$$

Out[17]=

$$-\frac{2\,x}{\sqrt[3]{x}}-\frac{1-x^{2}}{3\,x\,\sqrt[3]{x}}$$

Out[18]=

$$\left(1-\frac{4}{(2+x)^{2}}\right)\text{Abs}'\left[x+\frac{4}{2+x}\right]$$

Out[19]=

$$\frac{(2-x)\left(\frac{1}{2-x}+\frac{1+x}{(2-x)^{2}}\right)}{(1+x)\,\text{Log}[10]}$$

Out[20]=

$$-\frac{\left(1-2\,x\right)\left(-1+2\,x\right)}{(2-x+x^{2})^{2}}-\frac{2}{2-x+x^{2}}$$

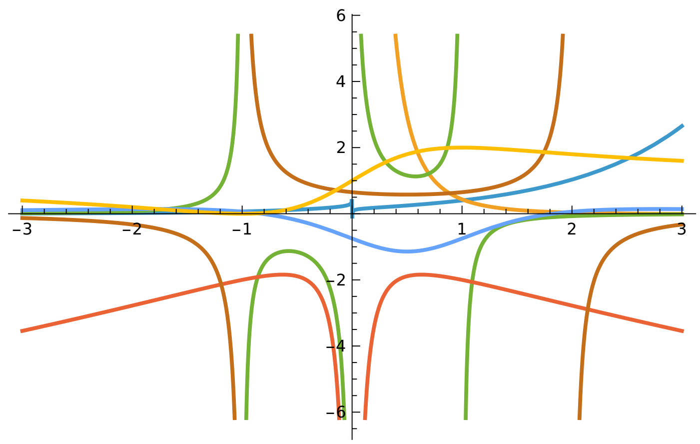
Out[21]=

$$1+\frac{2\,x}{1+x^{2}}$$

In[22]:=
```
DFf1[x_] := f1'[x]
DFf2[x_] := f2'[x]
DFf3[x_] := f3'[x]
DFf4[x_] := f4'[x]
DFf5[x_] := f5'[x]
DFf6[x_] := f6'[x]
DFf7[x_] := f7'[x]
DFf8[x_] := f8'[x]
```

In[30]:=
```
Plot[
{
DFf1[x],
DFf2[x],
DFf3[x],
DFf4[x],
DFf5[x],
DFf6[x],
DFf7[x],
DFf8[x],
},
{x, -3, 3}
]
```

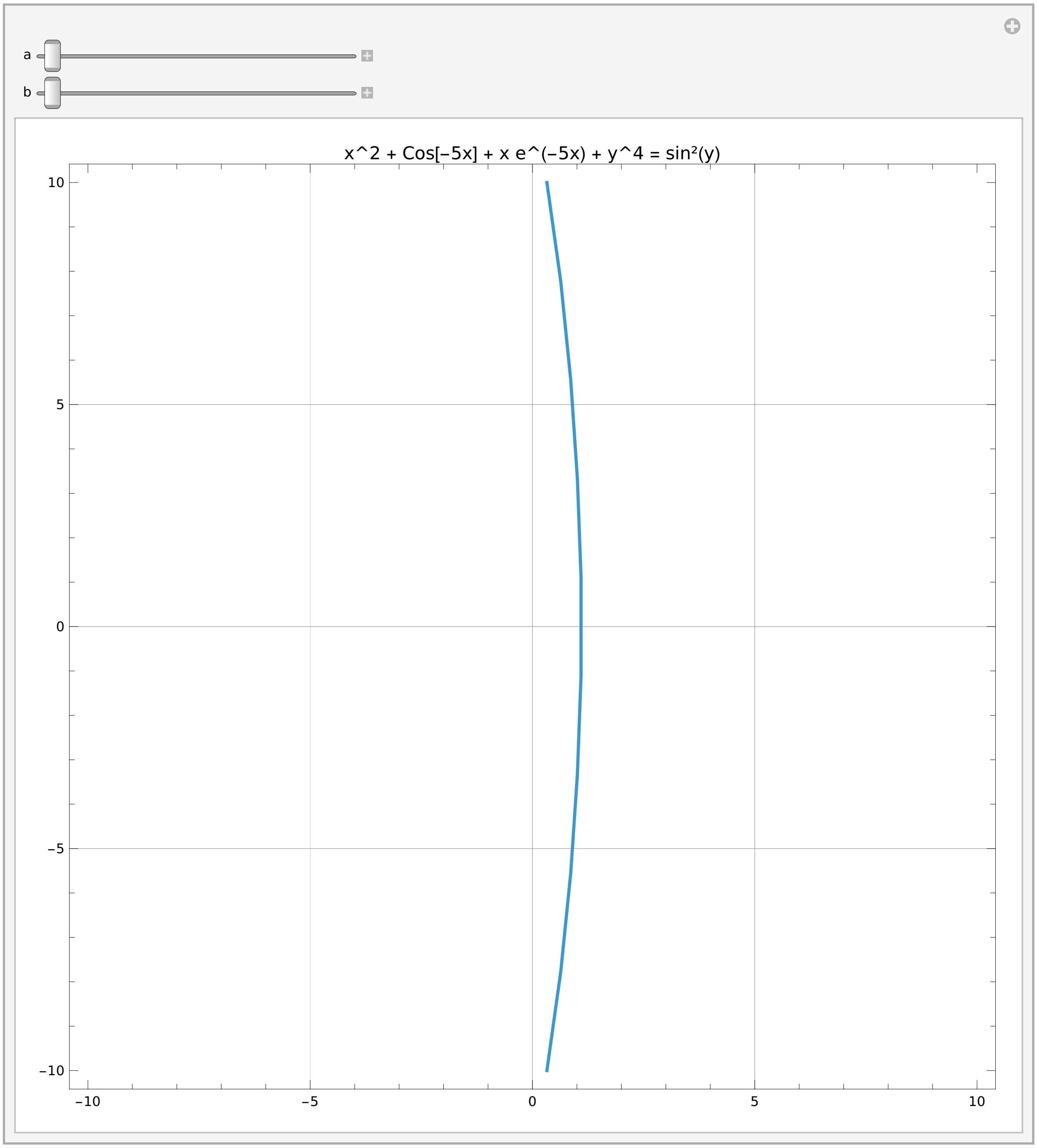
Out[30]=



Функция x^2 + cos(a*x)+ xe^(bx) +5+y^4 = [sin(y)]^2 в 2d

In[31]:=
```
Manipulate[
ContourPlot[
x^2 + Cos[a * x] + x * Exp[x * b] + y^2 - Sin[y]^2 == 0,
{x, -10, 10},
{y, -10, 10},
 PlotLabel →
  StringForm["x^2 + Cos[``x] + x e^(``x) + y^4 = sin²(y)", a, b],
 GridLines → Automatic,
 ImageSize → 600
],
{a, -5, 5},
{b, -5, 5},

ControlPlacement → Top,
 SynchronousUpdating → False
]
```

Out[31]=

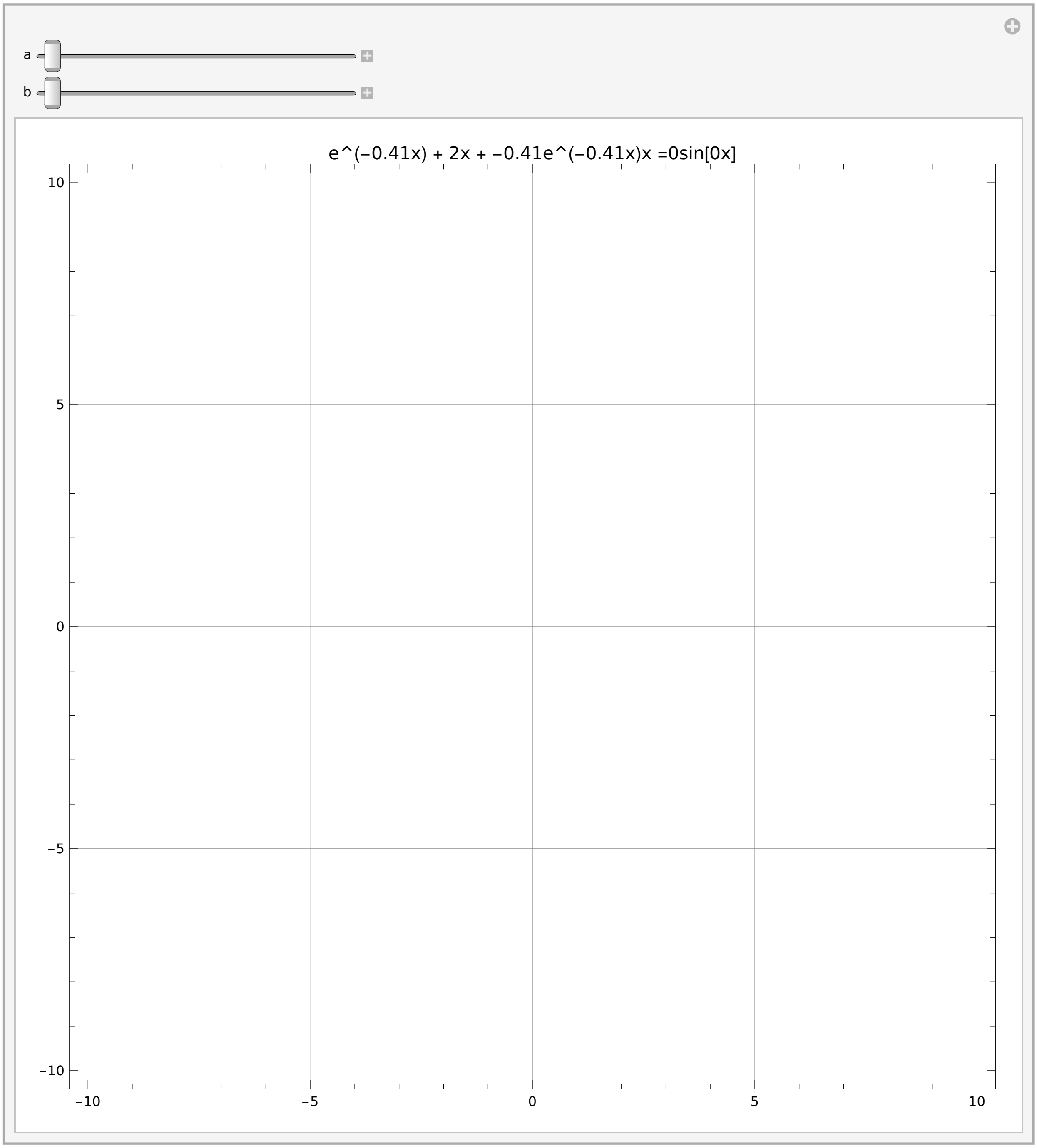


Производная от функции x^2 + cos(a*x)+ xe^(bx) +5+y^4 = [sin(y)]^2

в 2d по X

In[32]:=
```
Manipulate[
ContourPlot[
Exp[x * b] + 2 * x + b * Exp[x * b] * x - a * Sin[x * a] == 0,
{x, -10, 10},
{y, -10, 10},
 PlotLabel →
  StringForm["e^(``x) + 2x + ``e^(``x)x =``sin[``x]", b, b, b, a, a],
 GridLines → Automatic,
 ImageSize → 600
],
{a, 0, 2},
{b, -0.41, 5},

ControlPlacement → Top,
 SynchronousUpdating → False
]
```

Out[32]=

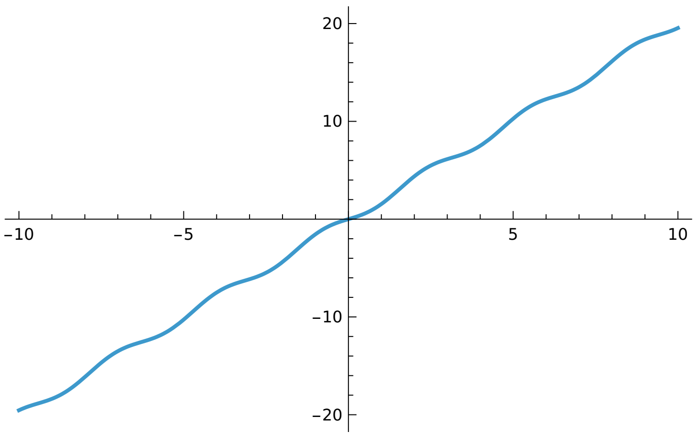


Производная от функции x^2 + cos(a*x)+ xe^(bx) +5+y^4 = [sin(y)]^2

в 2d по Y

In[33]:=
```
Plot[
2 x - Cos[x] × Sin[x],
{x, -10, 10}
]
```

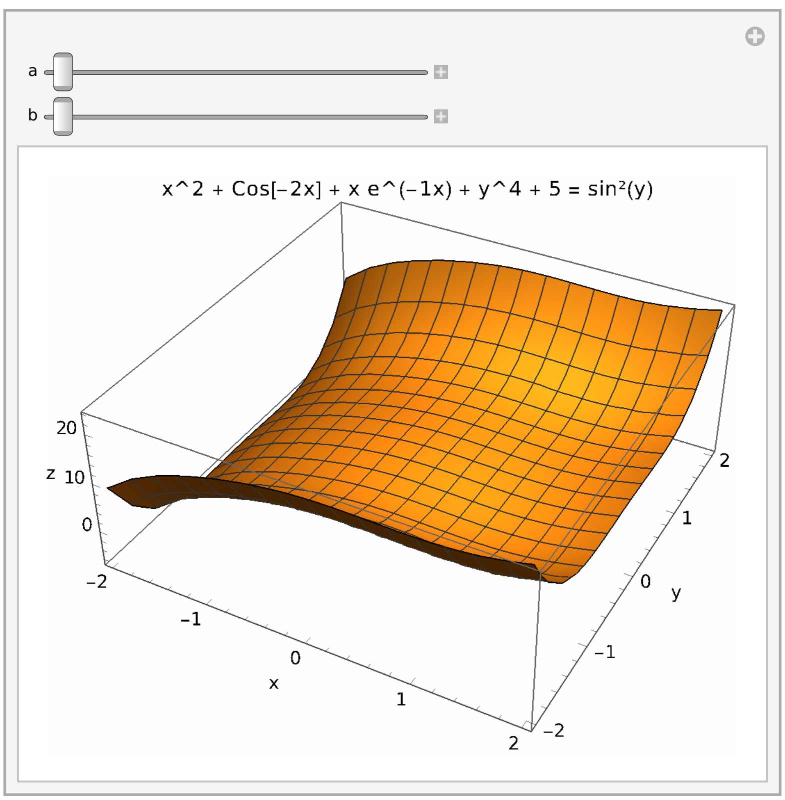
Out[33]=



Функция x^2 + cos(a*x)+ xe^(bx) +5+y^4 = [sin(y)]^2 в 3d

In[34]:=
```
Manipulate[
 Plot3D[
  x^2 + Cos[a*x] + x*Exp[b*x] + y^4 - (Sin[y])^2 + 5,
  {x, -2, 2},
  {y, -2, 2},
  AxesLabel → {"x", "y", "z"},
  PlotLabel →
   StringForm["x^2 + Cos[``x] + x e^(``x) + y^4 + 5 = sin²(y)", a, b],
  PlotRange → All,
  PerformanceGoal → "Quality"
 ],
 {a, -2, 2},
 {b, -1, 1}
]
```

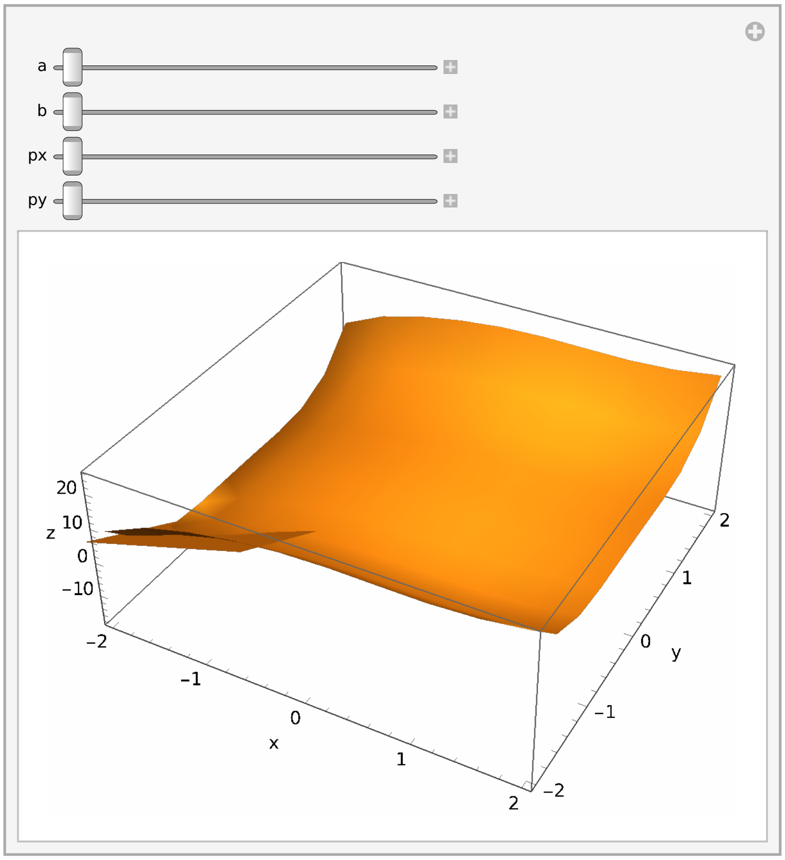
Out[34]=



Касательная к Функции x^2 + cos(a*x)+ xe^(bx) +5+y^4 = [sin(y)]^2

In[35]:=
```
Manipulate[
 Module[{f, grad, tangentPlane, x0 = px, y0 = py},

  f[x_, y_] := x^2 + Cos[a*x] + x*Exp[b*x] + 5 + y^4 - Sin[y]^2;

  grad = {D[f[x, y], x], D[f[x, y], y]} /. {x → x0, y → y0};
  tangentPlane[xx_, yy_] := f[x0, y0] + grad[[1]]*(xx - x0) + grad[[2]]*(yy - y0);

  Show[
   Plot3D[
   x^2 + Cos[a*x] + x*Exp[b*x] + 5 + y^4 - Sin[y]^2,
   {x, -2, 2},
   {y, -2, 2}
 ],

   Plot3D[
     tangentPlane[x, y],
     {x, x0 - 1, x0 + 1},
     {y, y0 - 1, y0 + 1}
 ],

 AxesLabel → {"x", "y", "z"}
  ]
  ],

 {a, -2, 2, 0.1},
 {b, -1, 1, 0.1},
 {px, -1.5, 1.5, 0.1},
 {py, -1.5, 1.5, 0.1}
]
```

Out[35]=



Кривизна у функции x^2 + cos(a*x)+ xe^(bx) +5+y^4 = [sin(y)]^2 в 2d

In[36]:=

```
Manipulate[
 Module[{f, grad, hess, curvature, radius, center, x0 = px, y0 = py},

  f[x_, y_] := x^2 + Cos[a*x] + x*Exp[b*x] + 5 + y^4 - Sin[y]^2;

  (* Градиент и нормаль *)
  grad = {D[f[x, y], x], D[f[x, y], y]} /. {x → x0, y → y0};
  normal = Normalize[grad];
  tangent = {-normal[[2]], normal[[1]]};
```

```
(* Кривизна *)
curvature = Module[{fxx, fxy, fyy},
 fxx = D[f[x, y], x, x] /. {x → x0, y → y0};
 fxy = D[f[x, y], x, y] /. {x → x0, y → y0};
 fyy = D[f[x, y], y, y] /. {x → x0, y → y0};

 (fxx*normal[[2]]^2 - 2*fxy*normal[[1]]*normal[[2]] + fyy*normal[[1]]^2)/
 Norm[grad]
];

radiusCurvature = If[Abs[curvature] > 0.0001, 1/Abs[curvature], 1000];
center = {x0, y0} + radiusCurvature*normal*Sign[curvature];


Show[
 ContourPlot[f[x, y] == 0, {x, -3, 3}, {y, -3, 3},
  ContourStyle → {Blue, Thick}
    ],

 If[Abs[curvature] > 0.001,
  Graphics[{
   {Red, Dashed,
    Circle[center, radiusCurvature]},
   {Red, PointSize[0.03], Point[{x0, y0}]},
   {Green, PointSize[0.02], Point[center]},
   {Dashed, Gray, Line[{{x0, y0}, center}]}
  }]
 ],

 PlotRange → {{-5, 5}, {-5, 5}},
 ImageSize → 500
 ]
],

{a, -2, 2, 0.1},
{b, -1, 1, 0.1},
{px, -2, 2, 0.1},
{py, -2, 2, 0.1}
]
```

Out[36]=