Tangent Planes

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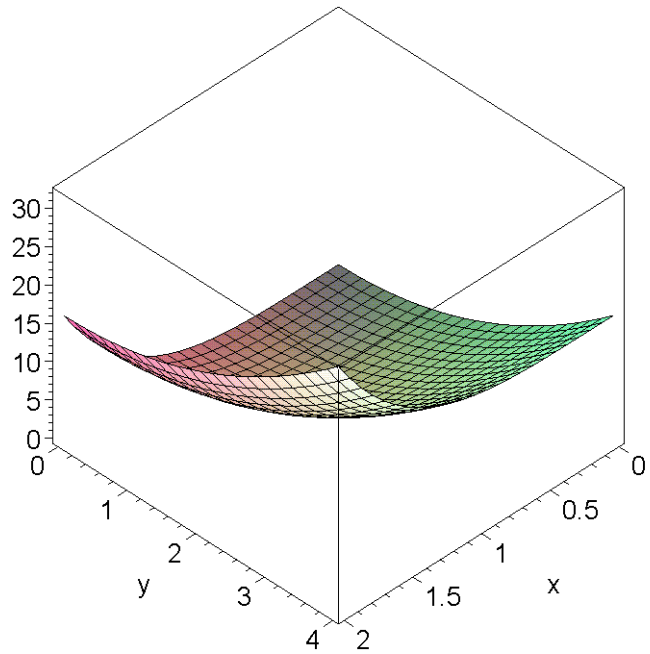
The Maple worksheet shows a few examples of tangent planes.

```
> with(plots):
Warning, the name changecoords has been redefined
```

```
> f := x^4+y^2;
```

$$f := x^4 + y^2$$

```
> plot3d(f,x=0..2,y=0..4,axes=boxed);
```

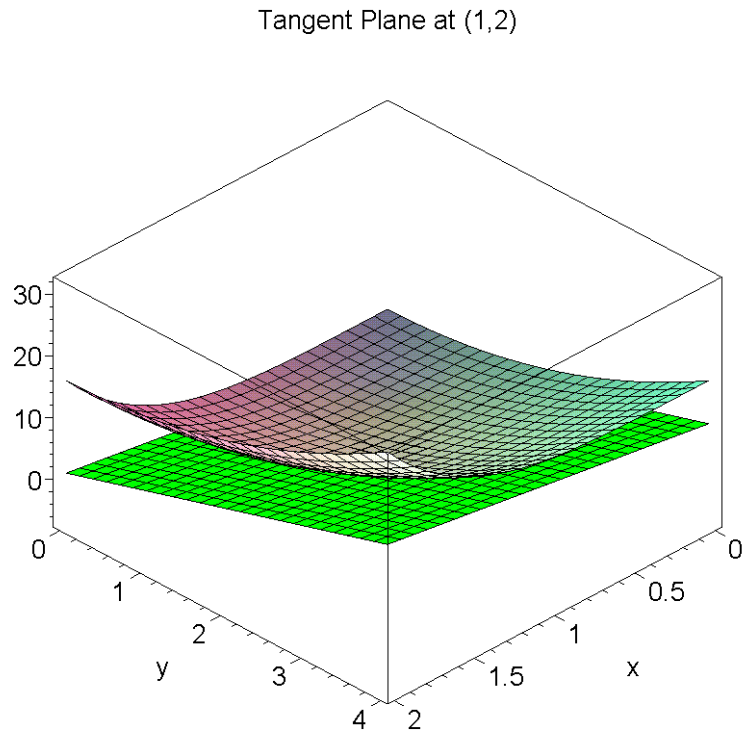


Use the Maple function "mtaylor" to find the equation of the tangent plane...

```
> L := mtaylor(g,{x=1,y=2},2);
```

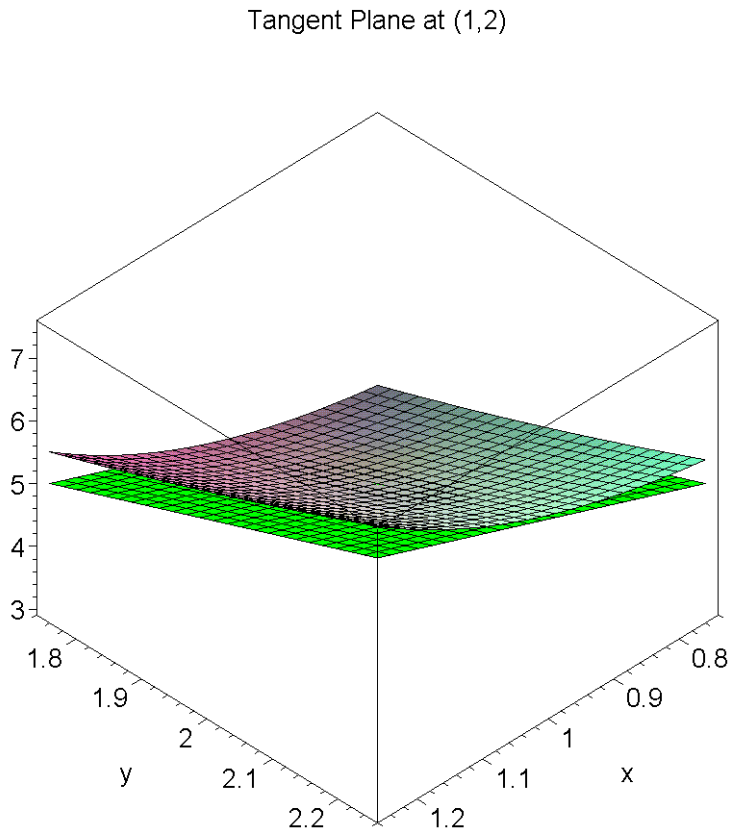
$$L := -7 + 4\,x + 4\,y$$

```
> p1 := plot3d(f,x=0..2,y=0..4,axes=boxed,title="Tangent Plane at
  (1,2)"):
> p2 := plot3d(L,x=0..2,y=0..4,color=green):
> display({p1,p2});
```



Now zoom in a bit...

```
> p1 := plot3d(f,x=0.75..1.25,y=1.75..2.25,axes=boxed,title="Tangent
  Plane at (1,2)"):
> p2 := plot3d(L,x=0.75..1.25,y=1.75..2.25,color=green):
> display({p1,p2});
```



Another example...

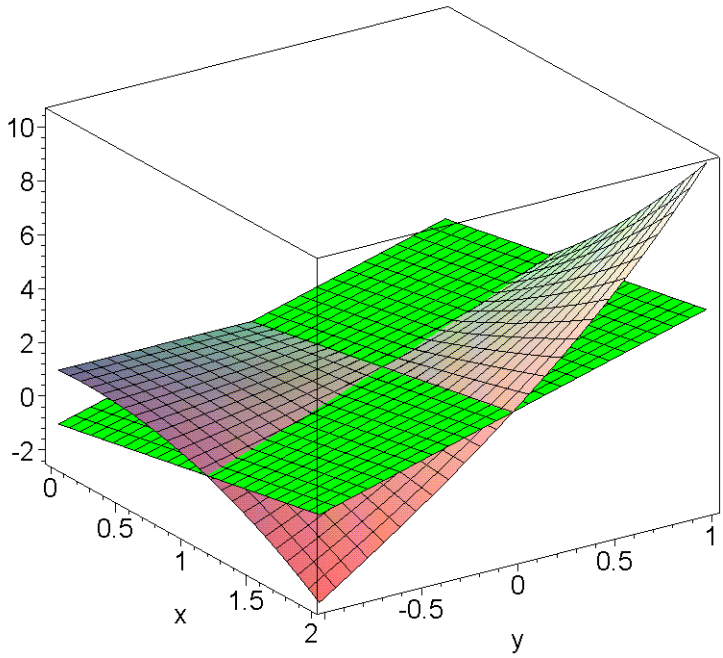
```
> g := x*exp(y)+x^2*y+1;
```

$$g := x\,\mathbf{e}^{y} + x^{2}\,y + 1$$

```
> K := mtaylor(g,{x=1,y=0},2);
```

$$K := x + 2\,y + 1$$

```
> p1 := plot3d(g,x=0..2,y=-1..1,axes=boxed):
> p2 := plot3d(K,x=0..2,y=-1..1,axes=boxed,color=green):
> display({p1,p2});
```



Note that the graph is saddle-like, so the tangent plane cuts the graph along two curves.

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