

Math 308

Pendulum without friction.

```
> with(plots):
```

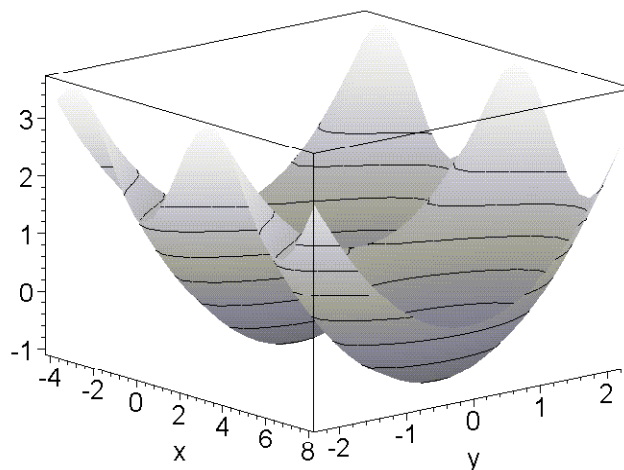
```
Warning, the name changecoords has been redefined
```

We saw in class that the trajectories in the phase plane are contour lines of the following function.

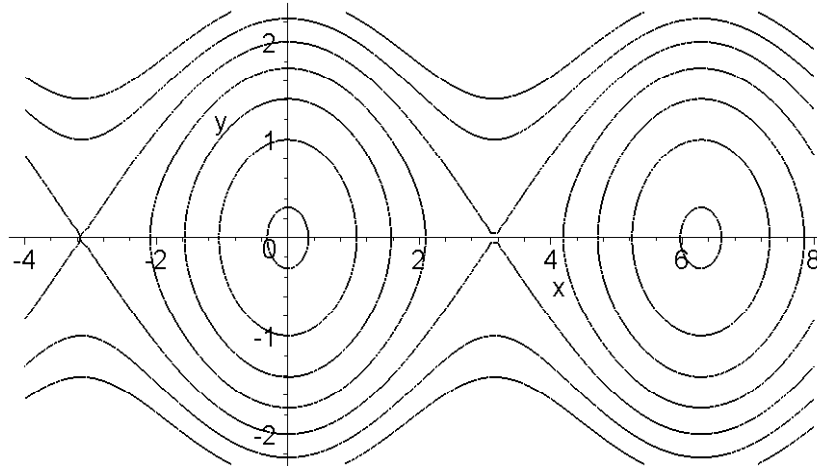
```
> H := y^2/2 - cos(x);
```

$$H := \frac{1}{2}y^2 - \cos(x)$$

```
> plot3d(H,x=-4..8,y=-2.3..2.3,style=patchcontour,orientation=[-40,70],axes=boxed,shading=zgrayscale,contours=[-0.95,-.5,0,.5,1,1.5,2]);
```



```
> contourplot(H,x=-4..8,y=-2.3..2.3,contours=[-0.95,-.5,0,0.5,1,1.5,2],grid=[101,101],color=black,thickness=2);
```



```
>
```