

restart : with(plots) : with(plottools) :

Define a function $h : A \rightarrow A$ by

$$1 + e^{h(x)} = x - h(x) \text{ for } x \text{ in } A;$$

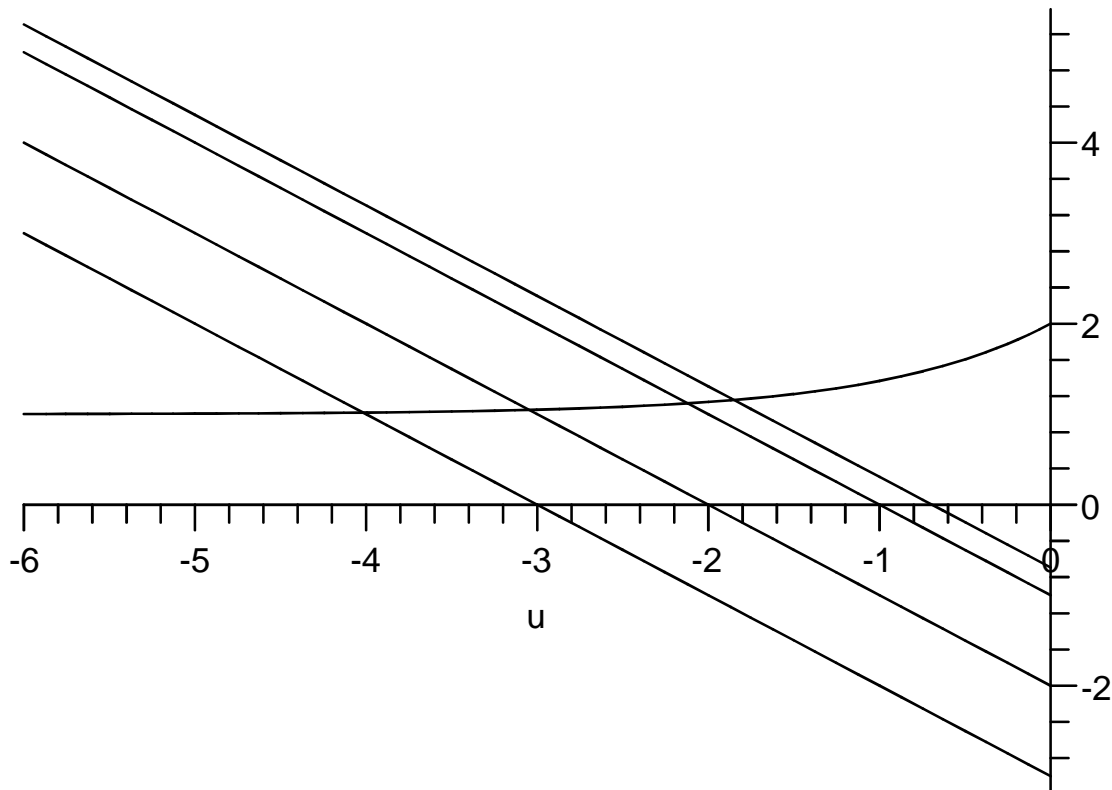
That is, $h(x)$ is the first coordinate of the intersection point of the graphs of two functions

$$f(u) = 1 + e^u \text{ and}$$

$$g(u) = x - u.$$

Plotted below are $f(u)$ and $g(u)$ for several x values -- what values of $h(x)$ can you estimate?

```
plot([1 + exp(u), -ln(2) - u, -1 - u, -2 - u, -3 - u], u = -6 .. 0, color = black);
```



Here are commands I used to create a table of values for $h(x)$.

```
> h := proc(x)
  [x, fsolve(1 + exp(y) = x - y, y)]: # this will output x, h(x) as an ordered pair.
end:
map(h, [-ln(2), -1, -1.5, -2, -2.5, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12]);
[[-ln(2), -1.850332132], [-1, -2.120028239], [-1.5, -2.576072213], [-2, -3.047478491], [-2.5, -3.529324712], [-3, -4.017989103], [-4, -5.006693000], [-5, -6.002472631], [-6, -7.000911052], [-7, -8.000335350], [-8, -9.000123395], [-9, -10.00004540], [-10, -11.00001670], [-11, -12.00000614], [-12, -13.00000226]]
>
```

(1)

