Simple Drive System

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This worksheet demonstrates the principle behind 2 wheel drive controlled by a single joystick with sensitivity correction

```
> restart;
```

The following are procedures that calculate the motion of the left (L) and right (R) wheels based on the co-ordinate of the joystick (x, y).
Make sure L and R are 8 bit unsigned or bigger.
Also realise that 0 is full back, 127 is neutral and 254 is full forward.

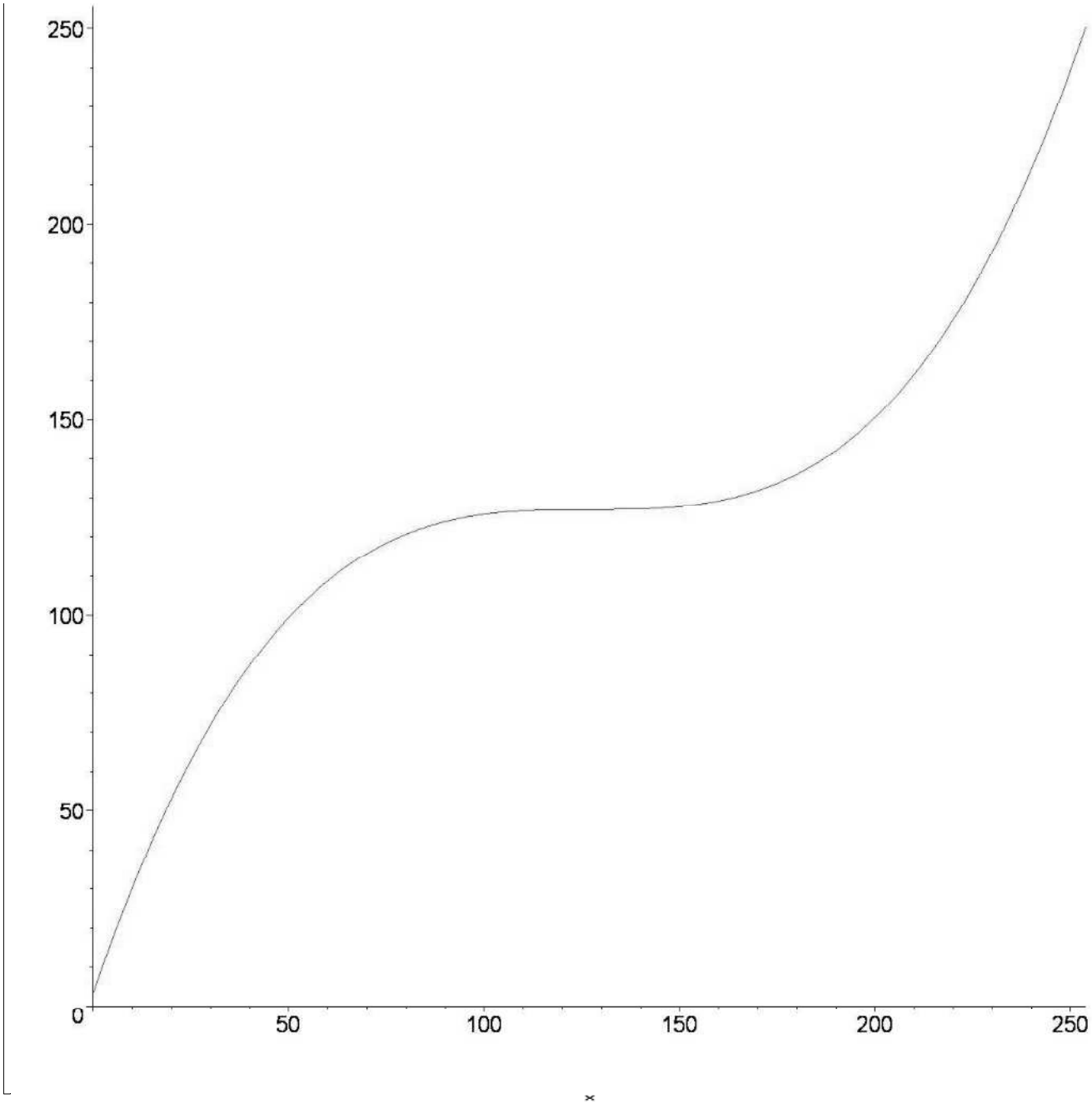
```
> L:=proc(x,y)
      if ((y-(x-127)) > 254) then
          254
      elif ((y-(x-127)) < 0) then
          0
      else
          y-(x-127)
      end if:
  end proc:
```

```
> R:=proc(x,y)
      if ((y+(x-127)) > 254) then
          254
      elif ((y+(x-127)) < 0) then
          0
      else
          y+(x-127)
      end if:
  end proc:
```

The following simply provides additional sensitivity for the driver at lower speeds. This is done by modelling the response curve to a third degree polynomial.
The response curve is shown in the graph.

```
> smooth:=x->((x-127)/25.5)^3+127:
```

```
> plot(smooth(x), x=0..254);
```




```
> Ls:=(x,y)->smooth(L(x,y)):
  Rs:=(x,y)->smooth(R(x,y)):
```

Feel free to test the final output by changing the values of the joystick (x, y)

```
> joy_x:=127:
  joy_y:=127:
  evalf(Rs(joy_x, joy_y));
  evalf(Ls(joy_x, joy_y));
```

127.

127.