

```
1  def calcOBSPID(sp, inp, oE, gains, dt):
2      ### Set the Kp, Ki, Kd values ###
3      Kp = gains[0]
4      Ki = gains[1]
5      Kd = gains[2]
6
7      ### Calculate the error ###
8      err = sp - inp
9
10     ### Calculate the P, I, and D values ###
11     P = Kp * err
12     I = Ki * (err + oE) * dt
13     D = Kd * (err - oE) / dt
14
15     ### Sum P, I, and D values ###
16     PID = P + I + D
17
18     ### Return PID ###
19     return PID
20
21
22  def calcLinePID(sp, inp, oE, gains, dt):
23      ### Set the Kp, Ki, Kd values ###
24      Kp = gains[0]
25      Ki = gains[1]
26      Kd = gains[2]
27
28      ### Calculate the error ###
29      err = sp - inp
30
31      ### Calculate the P, I, and D values ###
32      P = Kp * err
33      I = Ki * (err + oE) * dt
34      D = Kd * (err - oE) / dt
35
36      ### Sum P, I, and D values ###
37      PID = P + I + D
38
39      ### Return PID ###
40      return PID
41
42
```