```
// "An enhanced easier inverted pendulum balancing robot"
// You need only an hour to enhance it, if you have three Materials.
// (This sketch is ver.2.1.d for a digital output gyroscope.)
// No timer library is used in this version.
// But stability of robot is more improved than earlier version.
// A sample receiving sketch of Processing should be rewrite in a few lines.
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byte countS = 0;
int recOmegaI[10];
int omegaI = 0;
long thetaI = 0;
long sumPower  = 0;
long sumSumP  = 0;
const int kAngle = 65;
const int kOmega = 360;
const long kSpeed = 65;
const long kDistance = 350;
long powerScale;
int power;
long vE5 = 0;
long xE5 = 0;

/*** added (1) ********************/
int c1 = 0;
int c2 = 0;
int ax, ay, az;
long R;
/*** added (1): end ***************/

#include <SPI.h>

void L3GD20_write(byte  reg,byte val) {
  digitalWrite(10, LOW);
  SPI.transfer(reg);
  SPI.transfer(val);
  digitalWrite(10, HIGH);
}
byte L3GD20_read(byte reg) {
  byte ret = 0;
  digitalWrite(10, LOW);
  SPI.transfer(reg | 0x80);
   ret =SPI.transfer(0);
  digitalWrite(10, HIGH);
  return ret;
}

/*** added (2) ********************/
void LIS3DH_write(byte  reg,byte val) {
  digitalWrite(3, LOW);
  SPI.transfer(reg & 0b00111111);
  SPI.transfer(val);
  digitalWrite(3, HIGH);
}
byte LIS3DH_read(byte reg) {
  byte ret = 0;
  digitalWrite(3, LOW);
  SPI.transfer(reg | 0b10000000);
   ret =SPI.transfer(0);
  digitalWrite(3, HIGH);
  return ret;
}
/*** added (2): end ***************/

void setup () {
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```
  Serial .begin(115200);
  pinMode(4, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(8, OUTPUT);
  pinMode(9, OUTPUT);
  for  (int i = 0 ; i < 10 ; i++ ) { recOmegaI[i] = 0; }

/*** added (3) ********************/
  pinMode(3, OUTPUT);
  digitalWrite(3, HIGH);
/*** added (3): end ***************/

  pinMode(10, OUTPUT);
  digitalWrite(10, HIGH);
  SPI.begin();
  SPI.setBitOrder(MSBFIRST);
  SPI.setDataMode(SPI_MODE3);
  SPI.setClockDivider(SPI_CLOCK_DIV2);
  L3GD20_write(0x20, B11001111);
  L3GD20_write(0x23, B00000000);

/*** added (4) ********************/
  LIS3DH_write(0x20, B10010111);
  LIS3DH_write(0x23, B00001000);
/*** added (4): end ***************/

  delay(300);
}

void loop () {
  chkAndCtl();

/*** added (5) ********************/
  R=0;
  c1 = 0;
  c2 = 0;
/*** added (5): end ***************/

  if ( power > 0 ) {
    analogWrite( 6, power );
    digitalWrite(  4,HIGH        );
    digitalWrite(  5,LOW   );
    analogWrite( 9, power );
    digitalWrite(  7,HIGH        );
    digitalWrite(  8,LOW   );

/*** added (6) ********************/
    for  (int i = 0 ; i < 20 ; i++ ) {
      c1 = c1 +analogRead(A1);
      c2 = c2 +analogRead(A2);
     R = R + ( (L3GD20_read(0x2B) << 8) | L3GD20_read(0x2A) );
    }
/*** added (6): end ***************/

   }else {
    analogWrite( 6, - power );
    digitalWrite(  4,LOW         );
    digitalWrite(  5,HIGH   );
    analogWrite( 9, - power );
    digitalWrite(  7,LOW         );
    digitalWrite(  8,HIGH   );

/*** added (7) ********************/
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```
    for  (int i = 0 ; i < 20 ; i++ ) {
       c1 = c1 -analogRead(A1);
       c2 = c2 -analogRead(A2);
      R = R + ( (L3GD20_read(0x2B) << 8) | L3GD20_read(0x2A) );
    }
/*** added (7): end ***************/

  }

/*** added (8) ********************/
  omegaI = R * 0.00875 / 20;//The similar line to this line is found in "chkAndCtl()" in the original sketch.
  Serial .print(millis());  Serial .print(",");
  Serial .print(kAngle * thetaI / 100);Serial .print(",");
  Serial .print(kOmega * omegaI / 100);Serial .print(",");
  Serial .print(kSpeed * vE5 / 1000);Serial .print(",");
  Serial .print(kDistance * xE5 / 1000);Serial .print(",");
  Serial .print(c1/20);  Serial .print(",");
  Serial .print(c2/20);  Serial .print(",");
  Serial .print(ax);  Serial .print(",");
  Serial .print(ay);  Serial .print(",");
  Serial .println(az);
/*** added (8): end ***************/

}

void chkAndCtl() {

/*** added (9) ********************/
  ax = ( (LIS3DH_read(0x29) << 8) | LIS3DH_read(0x28) );
  ay = ( (LIS3DH_read(0x2B) << 8) | LIS3DH_read(0x2A) );
  az = ( (LIS3DH_read(0x2D) << 8) | LIS3DH_read(0x2C) );
/*** added (9): end ***************/

  if  (abs( omegaI ) < 2 ) { omegaI = 0; }
  recOmegaI[0] = omegaI;
  thetaI = thetaI + omegaI;

   countS  =  0;
  for  (int i = 0 ; i < 10 ; i++ ) {
    if  (abs( recOmegaI[i] ) < 4 ) { countS++; }
  }
  if ( countS > 9 ) {
    thetaI = 0;
    vE5 = 0;
    xE5 = 0;
    sumPower = 0;
    sumSumP = 0;
  }
  for  (int i = 9 ; i > 0 ; i-- ) { recOmegaI[ i ] = recOmegaI[ i-1 ]; }
  powerScale = ( kAngle * thetaI / 100 ) + ( kOmega * omegaI / 100 ) + ( kSpeed * vE5 / 1000 ) + ( kDistance * xE5 / 1000 );
   power =max  (min ( powerScale , 255 ) , -255 );//This line is different from the original sketches.
  sumPower = sumPower + ( ( c1 + c2 ) / 20 / 0.552);//This line is different from the original sketches.
  sumSumP = sumSumP + sumPower;
  vE5 = sumPower;
  xE5 = sumSumP / 1000;
}
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