In order to define a mathematical model of the energy consumption of the arm, a few considerations were taken:

* + The robot is going to work under zero (or very low) gravity;
  + The robot is going to work on vacuum or very thin atmosphere;
  + Power consumption is constant over time at a given rotation speed;
  + Rotation speed of servomotors is constant over time (we will command them accordingly).

Under the previous assumptions, the energy consumed by each servo is directly proportional to its rotation angle during the movement.

By applying the principle of superposition, the total energy consumption for the physical part will be the summation of power consumed by every actuator, i.e. directly proportional to the summation of all rotation angles.

A function implementing the following code snippet (C language) after calculation of the N-M algorithm for each intermediate point may be useful in order to calculate the value of this summation:

for(i=0; i<NUM\_POINTS; i++) {

total\_angle+=abs\_v(ang[0]+ang[1]+ang[2]+ang[3]+ang[4]+ang[5]);

}

double abs\_v(double x) {

if (x<0) x=-x ;

return x;

}

The constant of proportionality in order to convert to desired units must be found through calibration of the power source setup.