e-Yantra Robotics Competition

eYRC-BB#2403

Task 3-1 – Speed Measurement

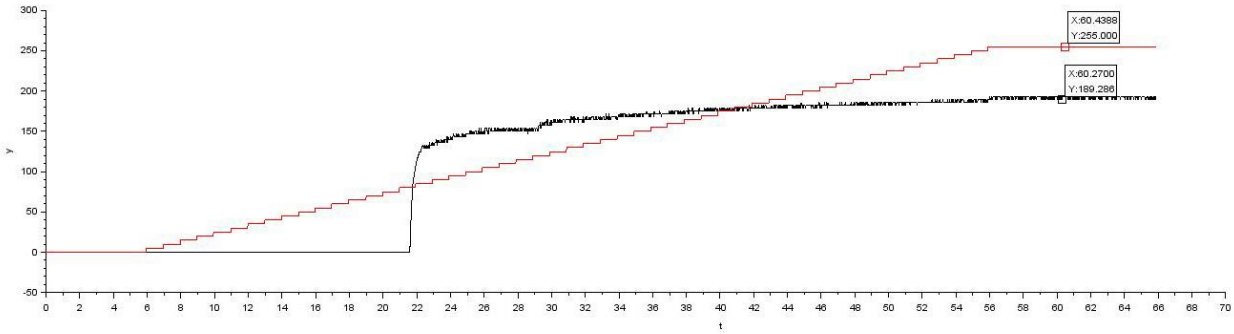
All measurements and analysis were done under the following conditions:

- Both the wheels were attached to the motors.
- Both the motors were on and speed was measured together.
- Battery level was at 11.3 V.
- The speed of the motors was computed at a rate of 50Hz (every 20ms).
- The PWM values were incremented in steps of +5 every 1 second.

1. The PWM/RPM vs. Time data was visualized for both motors in XCOS/SCILAB

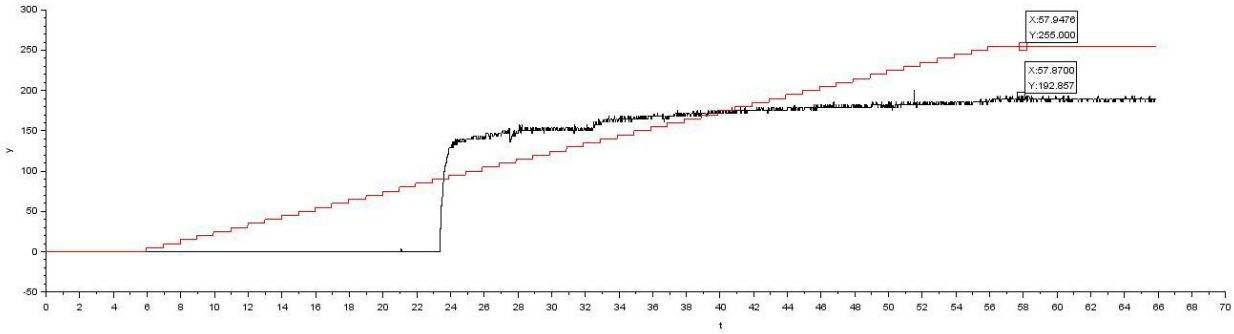
Left Motor

PWM/RPM vs Time Plot in XCOS



Right Motor

PWM/RPM vs Time Plot in XCOS

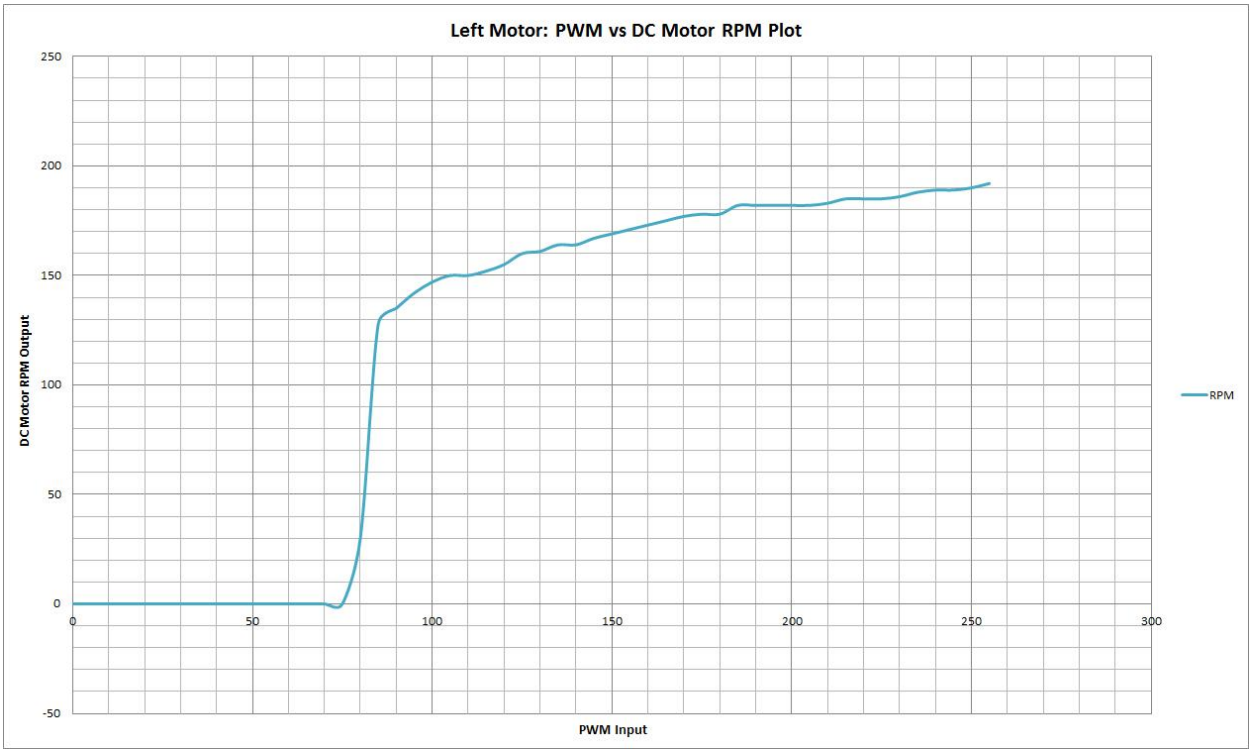


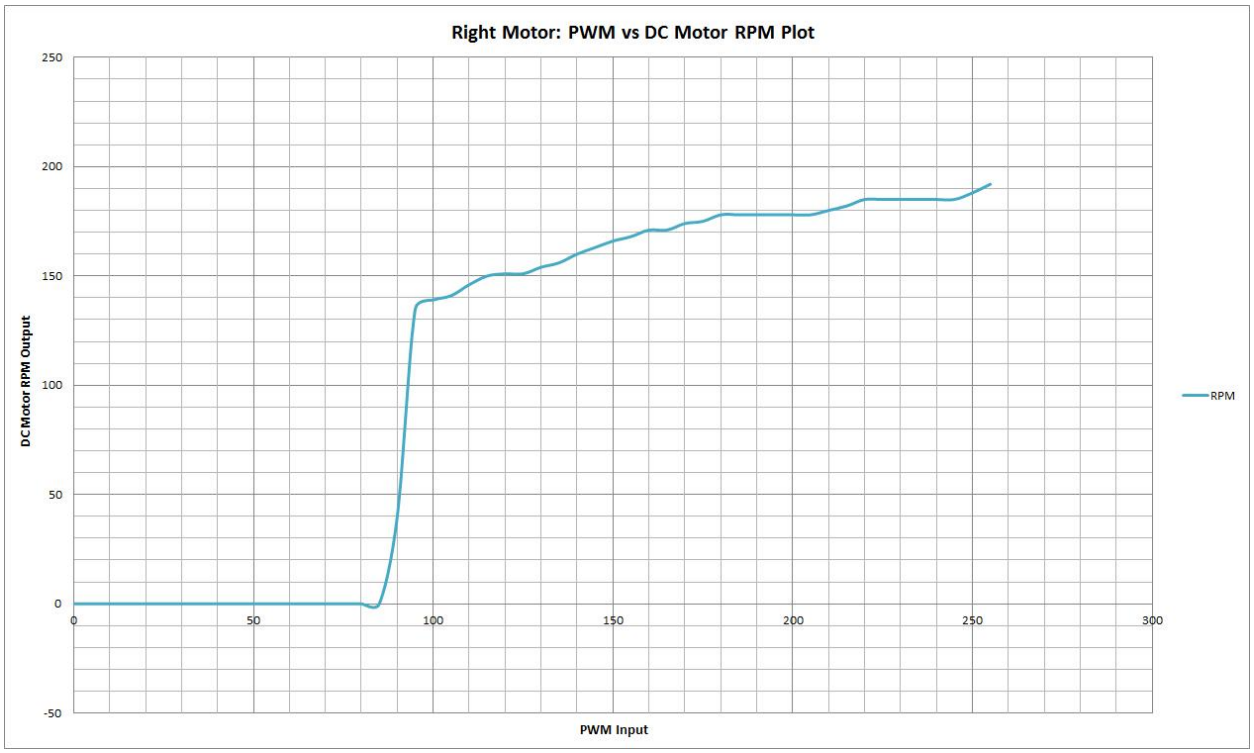
2. The PWM vs. RPM data is tabulated as follows.

LEFT MOTOR					
PWM	RPM	PWM	RPM	PWM	RPM
0	0	85	128	170	177
5	0	90	135	175	178
10	0	95	142	180	178
15	0	100	147	185	182
20	0	105	150	190	182
25	0	110	150	195	182
30	0	115	152	200	182
35	0	120	155	205	182
40	0	125	160	210	183
45	0	130	161	215	185
50	0	135	164	220	185
55	0	140	164	225	185
60	0	145	167	230	186
65	0	150	169	235	188
70	0	155	171	240	189
75	0	160	173	245	189
80	30	165	175	250	190
				255	192

RIGHT MOTOR					
PWM	RPM	PWM	RPM	PWM	RPM
0	0	85	0	170	174
5	0	90	40	175	175
10	0	95	135	180	178
15	0	100	139	185	178
20	0	105	141	190	178
25	0	110	146	195	178
30	0	115	150	200	178
35	0	120	151	205	178
40	0	125	151	210	180
45	0	130	154	215	182
50	0	135	156	220	185
55	0	140	160	225	185
60	0	145	163	230	185
65	0	150	166	235	185
70	0	155	168	240	185
75	0	160	171	245	185
80	0	165	171	250	188
				255	192

3. The PWM vs. RPM data is plotted separately and together for the motors as shown below.





Observations: For the range of PWM values, 0~85, speed of motors was 0 RPM. RPM of the motors was found to be linear within the range 100-255 of PWM input. At PWM of 255, the speed was ~190 RPM (with the wheels mounted). The max no load speed as per the datasheet is 200 RPM.