

FIG P9-2, 50 RPM FIND MAXIMUM, MINIMUM AND AVERAGE POWER
USING TORQUE DATA FROM TABLE P9-1

$$P = T\omega$$

$$\omega = \frac{\text{rev}}{\text{min}} \times \frac{2\pi \text{ rad}}{\text{rev}} \times \frac{1 \text{ min}}{60 \text{ sec}} \rightarrow \omega = 50 \text{ rpm} \times \frac{2\pi \text{ rad}}{\text{rev}} \times \frac{1 \text{ min}}{60 \text{ sec}} = 5.236 \frac{\text{rad}}{\text{sec}}$$

HAND CALCULATIONS FOR ROW a:

$$P_{\max} = T_{\max} \omega = 2000 \text{ Nm} \times 5.236 \frac{\text{rad}}{\text{sec}} = 10,472 \text{ Watts} = 10.5 \text{ kW}$$

$$P_{\min} = T_{\min} \omega = 0$$

$$P_{\text{Avg}} = T_{\text{Avg}} \omega = 1000 \text{ Nm} \times 5.236 \frac{\text{rad}}{\text{sec}} = 5.2 \text{ kW}$$

TABLE P9-1 PLUS

ROW	$T_{\min}$	$T_{\max}$	T_{Avg}	$P_{\min}$	$P_{\max}$	P_{Avg}
a	0	2,000	1,000	0.00	10.5	5.2
b	-100	600	250	-0.52	3.1	1.3
c	-200	400	100	-1.05	2.1	0.5
d	0	2,000	1,000	0.00	10.5	5.2
e	-200	500	150	-1.05	2.6	0.8
f	1,000	2,000	1,500	5.2	10.5	7.9

ALL TORQUES IN Nm AND ALL POWERS IN kW