

6 Parallel operation of d.c. motors

As in the case of generators motors may also be required to operate in parallel driving a common load. The benefits as well as the problems in both the cases are similar. As the two machines are coupled to a common load the speed of the load is the common parameter in the torque speed plane. The torque shared by each machine depends on the intersection of the torque speed curves. If the torque speed lines are drooping the point of intersection remains reasonably unaltered for small changes in the characteristics due to temperature and excitation effects. However if these curves are flat then great changes occur in torque shared by each machine. The machine with flatter curve shares a larger portion of the torque demand. Thus parallel operation of two shunt motors is considerably more difficult compared to the operation of the same machines as generators. The operation of level compounded generators is much more difficult compared to the same machines working as cumulative compounded motor. On a similar count parallel operation of cumulative compounded motors is easier than shunt motors. Series motors are, with their highly falling speed with the load torque, are ideal as far as the parallel operation is considered. Considerable differences in their characteristics still do not affect adversely their parallel operation. One application where several series motors operate in parallel is in electric locomotives. Due to the uneven wear and tear of the wheels of the locomotive the speeds of the rotation of these motors can be different to have the same common linear velocity of the locomotive. The torque developed by each machine remains close to the other and there is no tendency for derailment. The torque speed curves for parallel operation of series motors are given in Fig. 44

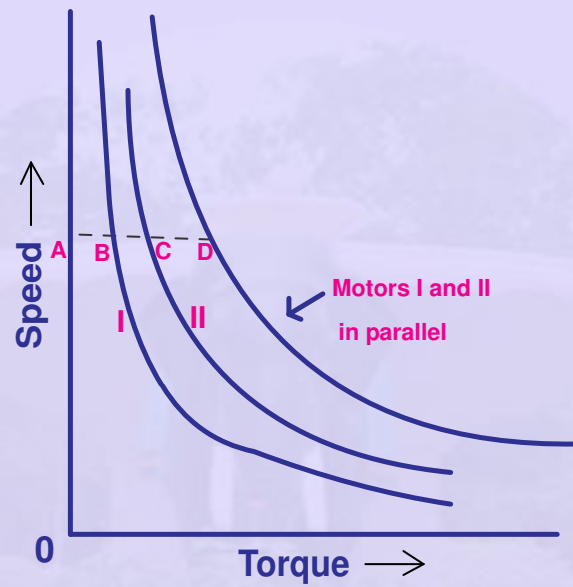


Figure 44: Parallel operation of Series motors