4.1 V/F control

Synchronous speed is directly proportinal to frequency,similar ti induction motors constant flux operation below base speed is achiecved by operating the synchronous motor with constant (V / f) ratio.

The synchronous motor either run at synchronous speed (or) it will not run at all. Hence variable frequency control may employ any of the following two modes

   1.Separate controlled mode
   2.Self controlled mode

SEPARATE CONTROLLED MODE

This method can also be used for smooth starting and regenerative braking.An example for true synchronous mode is the open loop (V/f) speed control shown in fig
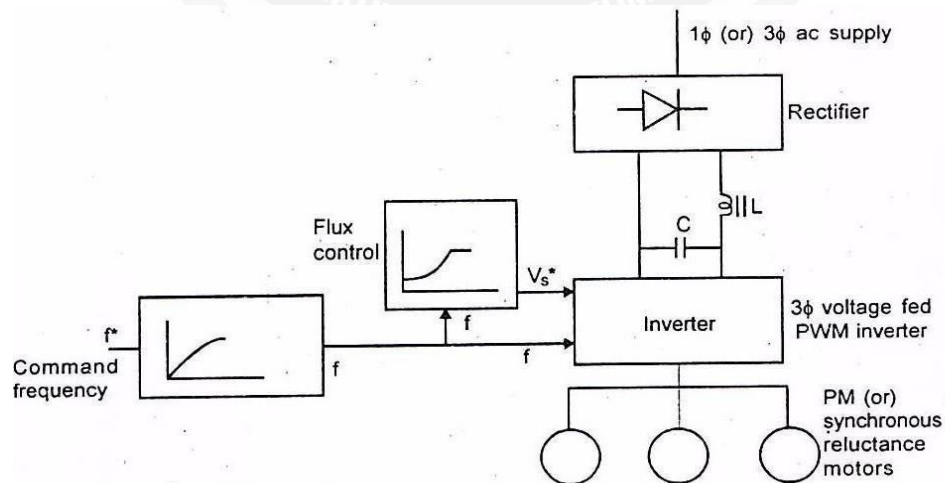

Figure 3.1.1   Separate Controlled Mode

(Source:"Fundamentals of Electrical Drives" by G.K.Dubey,page-257)

Here all the machines are connected in parallel to the same inverter and they move in response to the command frequency f* at the input. The frequency command f* after passing through the delay circuit is applied to the voltage source inverters (or) a voltage fed PWM inverter. This is done so that the rotor source is able to track the change in frequency.

A flux control black is used which changes the stator voltage with frequency so as to maintain constant flux for speed below base speed and constant terminal voltage for speed above base speed.The front end of the voltage fed PWM inverter is supplied from utility line through a diode rectifier and LC filter.the machine can be built with damper winding to prevent oscillations.