**AbstracT**

The main motive of this work is to analyze a typical configuration of a Wind Turbine Generator System [WTGS] equipped with variable speed generator. Now-a-days doubly fed Induction generators (DIGs) are being widely used in WTGS. It is based on an Induction generator with multi-phase wound rotor & multi-phase slip ring assembled with brushes for access to the rotor windings.

So, facing drawbacks such as decrease in efficiency, cost and size. If electromagnetic synchronous generator is used which has rotor current, losses increases there by efficiency decreases. So, In order to overcome this drawback, we adopt permanent magnet synchronous generator in which the rotor current is zero which is very beneficial. And in this work, “Direct drive” technique is adopted where gearbox is not present which in turn reduces the weight of nacelle and reduction of cost. Apart from the generator, the analyzed WTGS consists of another three parts: wind speed, wind turbine and drive train .

These elements have been designed and equations that explain their behavior have presented in and the total system is implemented in MAT LAB/SIMULINK interface.