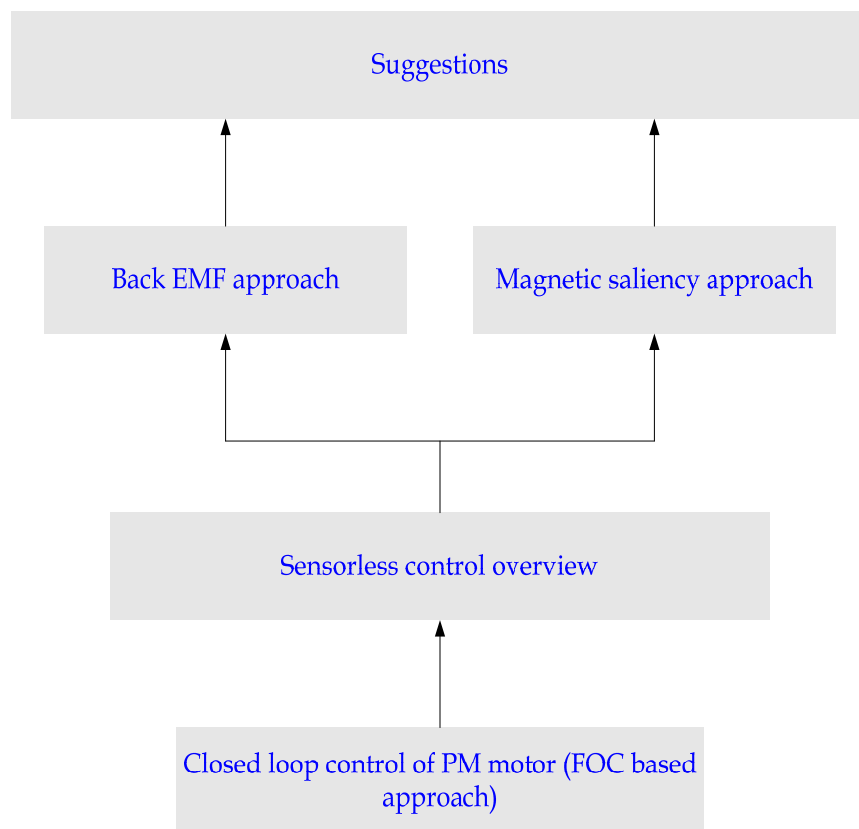

Methodology

This chapter describes the strategy adopted in order to obtain a solution to the defined problem within the thesis domain. The methodology to address the objectives and the overall report structure is described using flow charts and brief discussion.

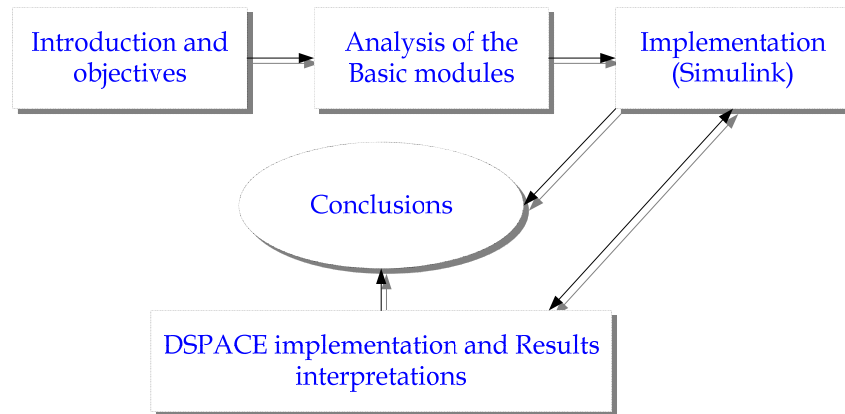
The solution to any problem requires a methodology or an algorithm to address the problem, in order to obtain the desired results. However, the choice of a given methodology depends on the problem structure, the available resources, the knowledge and understanding of the persons involved. To fulfill the objectives of this thesis, a bottom-to-up approach is adopted by defining basic abstraction levels, and gradually increasing the domain of each level.

Figure3.1:
*Illustration of the
adopted methodology
(A bottom-to-top
approach)*



This thesis report comprises of five sections which are graphically represented bellow (figure 3.2).

Figure3.2:
*Illustration of the
report structure.*



The first section (**Introduction and objectives**), starts with the features of PM motors. Some limitations related to the use of these machines in classical drive systems are presented, leading to the introduction of sensorless control schemes. An overview of the commonly used sensorless approaches is presented, leading to the definition of the thesis objectives.

In the second section (**Basic modules**), an analysis of the basic operations needed to develop (in Simulink), a given sensorless control scheme is presented.

The third section is dedicated to the **Implementation** of the selected sensorless control schemes in Simulink, in order to understand the starting criteria which could provide optimum torque production at zero (or low speed) when controlling PM motors.

The fourth section (**Implementation in DSPACE laboratory**), is aimed to apply the most promising simulated approach in real operating conditions of the PM machine.

Finally, **Conclusions** are drawn for the different steps involved in the project work to outline some of the aspects to consider in open loop control of Surface Mounted Permanent Magnet Motors.