Conclusion and Future Prospects

The overall aim of this thesis was to develop a sensorless control scheme for Surface Mounted Permanent Magnet Motor, providing maximum torque and accurate rotor position at low speed (from stand still), with a probable implementation of the given algorithm in dSpace laboratory.
After reviewing different sensorless control schemes for PM machines, two effectives sensorless algorithms were developed, the modified voltage model and the adaptive observer, all combined with high frequency signal injection (at zero and low speeds).
A common feature for the two algorithms is the simplicity involved in the designing steps, since no high frequency machine component (e.g. high frequency impedance difference) is needed, providing that no extra-high frequency test needs to be performed on the machine in order to be able to use the algorithm.
The algorithm based on adaptive observer features good performance (robustness, stability, transient disturbance rejection capability...), compared to the algorithm based on modified voltage model.
Therefore, this can be seen as an advanced observer for low speed sensorless control of Surface Mounted Permanent Magnet Motor, and appears in this thesis as the suggested approach (see flowchart in chapter three) of the end product of this thesis.
Since, it is known that any research work requires improvement in order to achieved advanced (or more sophisticated) results.
Therefore, as future aspects to be considered for this project, the following points can be emphasized:

- Implementation of the developed algorithm using dSpace accessories or DSP.
- Minimum base speed at which the observer do not fail
- The impact of the machine parameters sensitivity
- Consideration of a non linear machine model
- General purpose feature of the designed algorithm

The afore mentioned aspects of improvement show that there is still enough room for improvement in this project, therefore any suggestion which could enlarge the achievement of the thesis is seen in advance as a challenging contribution.