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Further extensions

At the end of this Thesis, I list some additional points in my research about restricted Kalman filtering. Some of them are already under investigation.

Firstly, I cite additional *theoretical* points that sound interesting within the theme. Here they are:

- A study about state observability and parameters identification, which are two important issues to firmly establish the inferential grounds for state space models under linear restrictions.
- A formal investigation about possible connections between the results in Simon and Chia (2002) and the new proofs of restricted Kalman filtering presented in this Thesis.
- Analytical and/or Monte Carlo formal investigations into how the presumed additional information due to the use of the augmented restricted Kalman filtering translates to improvements for (*quasi*) maximum likelihood estimators.
- Derivation of results about combining diffuse initialization and linear restrictions under the approach by de Jong and Chun-Chun-Lin (2003), and, consequently, the analysis of how the new assumptions needed are more or less stringent than those considered in section 3.4.

Now, I concentrate on additional *methods*, so far not explored:

- Implementation of an *extended* restricted Kalman filtering in order to accomplish not only nonlinear equality constraints but also *inequality* constraints. In this respect, specific topics of interest would be the investigation of convergence of this extended approach and how this should be combined with *quasi* maximum likelihood estimation for the fixed parameters.
- Derivation of new tests for coefficients stability under linear restrictions, to which the material from section 3.3 could be of some value.

Lastly, I believe the following *applications* would be relevant to further illustrate and value already developed methodologies.

- Estimation of dynamic factor model with an exact *smoothing transition* coefficients under the same linear and interpretable portfolio restriction and also under some linear restriction about *leverage/hedge*.
- Formulation and estimation of *multivariate* benchmarking models aimed at prediction.