filtering

Jesus Fernandez-Villaverde <jesusfv@econ.upenn.edu> Fri, Aug 9, 2013 at 10:02 AM
To: David Backus <dbackus@stern.nyu.edu>

Hi David

Thanks! I should actually post more slides on my webpage. People seem to like them a lot.

With respect to your questions:

1) I am not 100% sure of what you mean by "conditions needed to determine a unique state". I guess that "state" is one of these words that people use in slightly different contexts (I have had long fights with Victor Rios about this ;).

The sense in which I use it (which is heavily influenced by optimal control) is just as any variable that encodes the information required to characterize the behavior of a dynamic system. In that sense of the word, there is never a "unique" state because I can always transform a state variable x, trivially, into (x/2) and multiply every coefficient of the state space representation where it appears by 2 (or some other number if the system is non-linear).

Even more, I can always change the variable to something different. For instance, in the neoclassical growth model I can use k_t (a pre-decision state variable) or k_t+1 (a post-decision state variable, k_t+1= (1-delta)*k_t+i_t) as state variable and everything will go through (engineers do this change of state variables between pre- and post-decision all the time, unfortunately in economics this is not exploited enough).

My answer, thus, would be to select the "state variable" that has the cleanest economic interpretation.

2) Identification: I attach one paper that works out local identification for an abstract linear Rational Expectations model (your model is likely to fit into the framework). For global identification, the results are more limited but you can check:

http://people.bu.edu/qu/dsge4/DSGE-0513.pdf

Results for non-linear systems are nearly non-existing.

There is also a literature on engineering on identification of state space representations more in general:

Ljung, L. (1999): System Identification: Theory for the User (2nd Edition), Prentice Hall, Upper Saddle River, NJ, USA.

A very nice book but not the reading I will take to the beach :)

Let me know if this helps or if you have more questions.

BTW, if you enjoy my lecture slides, let me send one that you may also find amusing. I am teaching this year a nice new class that I am calling "software engineering for economists". The idea is that there are already a few good books out there of numerical methods (Judd, Miranda, etc...) and that little by little knowledge of these methods have trickled-down the profession but that there is still little understanding of issues like which programming language to learn, advantages and disadvantages of different languages, how to pick a compiler, a profiler, how to debug, etc. So, I basically want to teach all that stuff.

The lecture slides I am attached are the introductory lesson and the chapter on programming languages since you asked me once about Octave versus Matlab. You will see that I talk a bit about Julia, a new programming language I find most interesting and that does surprisingly well in terms of speed (and it is very close to matlab in notation yet open-source).

See you soon

JFV

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3 attachments

iskrev.pdf
227K

Lecture_Software_Engineering_1.pdf
43K

Lecture_Software_Engineering_3.pdf
4251K