Note GMM estimation

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1 Introduction

In this note, you may find a short description how the code `GMM.m` operates. The code is still in its trial phase. If you find any instability, please, let me know.

The syntax of this function is very similar to the one you have seen with the Maxlik.m function. This is logic. GMM.m involves Maxlik.m

2 Mathematical analysis

We suppose that some statistical problem can be written as

$$\min_{\theta} g(\theta)\Omega^{-1}g(\theta).$$

Here, $g(\theta)$ is some function mapping a R^p vector of parameters into R^q. Examples of such a function will be given below. It is assumed that each component of the function $g(\theta)$ is associated with a certain measure of precision, translated as a matrix of variance covariance. The minimization then states that one seeks the parameters that minimize a certain quadratic form where each component gets weighted by its relative precision.

Example 1: It is possible to set OLS and IV estimation in that framework. Define

$$y_t = x_t\beta + u_t.$$

We assume that we have for each observation a certain vector of instruments, that is a vector of entities such that

$$E[z_t u_t] = 0.$$

In many cases, the x_t are just right. In that case, $\theta = \beta$ and $q = 1$. We may assume that there are more instruments than elements of x_t. Asymptotically:

Example 2: Estimation of an Euler equation.

3   Implementation

[beta, stderr, covbeta, Qmin, test, ptest] = GMM(MomFct,beta0,...
    A,b,Aeq,beq,lb,ub,nonlcon,options,...
    GMMLags,GMMiter,GMMtol1,GMMtol2,varargin);