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ECONOMETRIC THEORY
REVIEW QUESTIONS

Exact inference in dynamic models

1. Consider the model

$$X_t = \beta_0 + \sum_{k=1}^{p}\lambda_k X_{t-k} + u_t\ ,\ t = 1\,,\ \ldots\ ,\ n \tag{1}$$

and the problem of testing the hypothesis

$$H_0 : \sum_{k=1}^{p}\lambda_k = 1 \tag{2}$$

in the context of model (1).

(a) If $u_t \overset{i.i.d.}{\sim} N[0\,,\ \sigma^2]$ and p is known, propose an exact method for testing H_0.

(b) If $u_t \overset{i.i.d.}{\sim} \sigma t(1)$ and p is known, propose an exact method for testing H_0.
[$t(1)$ represents a Student t variable with 1 degree of freedom.]

(c) Discuss the problem of testing H_0 when p is unknown.