$$\mathrm{d}\ln q = a. + \mathrm{din} + \quad p_i + u_{,,} \tag{66}$$

a second-order flexible functional form. To overcome this, Barnett suggests setting $b=0$, the diagonal elements of B to zero, and forcing the off-diagonal elements of both A and B to be non-negative (the Laurent model (64) like the GL model (62) is globally regular if all the parameters are non-negative). The resulting budget equations are

$$= (a_i v_i + \quad E \quad \underset{Joi}{E} \tag{55}$$

where D is the sum over i of the bracketed expression. Barnett calls this the miniflex Laurent model. The squared terms guarantee non-negativity, but are likely to cause problems with multiple optima in estimation. Barnett and Lee (1983) present results comparable to those of Caves and Christensen's which suggest that the miniflex Laurent has a substantially larger regular region than either translog or GL models.

A more radical approach has been pioneered by Gallant, see Gallant (1981), and Gallant and Golub (1983), who has shown how to approximate indirect utility functions using Fourier series. Interestingly, Gallant replicates the Christensen, Jorgenson and Lau (1975) rejection of the symmetry restriction, suggesting that their rejection is not caused by the approximation problems of the translog. Fourier approximations are superior to Taylor approximations in a number of ways, not least in their ability to keep their approximating qualities in the face of the separability restrictions discussed in Section 4 below. However, they are also heavily parametrized and superior approximation may be being purchased at the expense of low precision of estimation of key quantities. Finally, many econometricians are likely to be troubled by the sinusoidal behavior of fitted demands when projected outside the region of approximation. There is something to be said for using approximating functions that are themselves plausible for preferences and demands.

The whole area of flexible functional forms is one that has seen enormous expansion in the last five years and perhaps the best results are still to come. In particular, other bases for spanning function space are likely to be actively explored, see, e.g, Barnett and Jones (1983).

2.6. Statistical testing procedures

The principles involved are most simply discussed within a single model and for convenience I shall use the Rotterdam system written in the form, $i = 1,\ldots,(n-1)$