Remark 10.2. We have not proved that the sampling design described in Theorem 6.1 yields the probabilities of including the elements i in the sample given by (10.2). However, this is well-known (see, for example, [9], § 2).

Remark 10.3. In the most important particular case when both the expected values $\mathsf{E}y_i$ and variances $\mathsf{V}y_i$ are stationary, we get the uniform (or self-weighting) systematic sampling. From the point of view of practice, the case of stationary coefficients of variations which we have considered is only slightly more general, since there are only a few examples, where the coefficients of variations are stationary even though the expected values and variances are not so. (Let us mention, as an example, the case where y_i and x_i denote the present and past city populations, respectively.)

In cases where the coefficients of variations are not stationary, the problem becomes more complicated, and a question arises whether a solution, common for all convex correlation function, exists at all. We should minimize the expression

$$\sum_{\lambda=1}^{\infty} \sum_{\omega=1}^{N+\lambda-1} [R(\lambda+1) - 2R(\lambda) + R(\lambda-1)] \, \mathsf{M}\Big(\sum_{i=\omega-\lambda+1}^{\omega} p_i(s) \, C_i\Big)^2$$

where $p_i(s)$ are given by (10.5) and C_i are the coefficients of variations, $i = 1, \ldots, N$. Moreover, in such cases, the supposition (10.2) and the estimator (10.3) cannot any longer be considered as "natural" ones and the whole problem ought to be reformulated.

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