18. G_{18}-ESTIMATE OF REGULARIZED T^2 -STATISTICS

A regularized T^2-statistic is defined as follows:

$$T_\varepsilon^2 = n(\vec{a} - \hat{\vec{a}})^T (I\varepsilon + \hat{R}_{m_n})^{-1} (\vec{a} - \hat{\vec{a}}),$$

where $\varepsilon > 0$ is small number.

The G_{18}–estimate of T_ε^2 is equal to

$$G_{18}(\varepsilon) = mn^{-1} b(\varepsilon)$$

where $b(\varepsilon)$ satisfies the equation K_8 (see Chapter 2, Theorem 8.1)

$$b(\varepsilon) = m^{-1} \mathrm{Tr}\, R_m \left\{ I\varepsilon + R_m \left[1 + mn^{-1} b(\varepsilon)\right]^{-1} \right\}^{-1}.$$

THEOREM 18.1. ([Gir69, p.151]) *If the conditions of Theorem 17.1 are fulfilled, then*

$$\operatorname*{p\lim}_{n\to\infty} \left[G_{18}(\varepsilon) - mn^{-1} b(\varepsilon)\right] = 0.$$

The case when $\vec{x} = \hat{\vec{a}}$ is considered in [Gir69, p.204-209].

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