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A note on the application of integrals involving cyclic products of kernels

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In statistics of stochastic processes and random fields, a moment function or a cumulant of an estimate of either the correlation function or the spectral function can often contain an integral involving a cyclic product of kernels. We define and study this class of integrals and prove a Young-Hölder inequality. This inequality further enables us to study asymptotics of the above mentioned integrals in the situation where the kernels depend on a parameter. An application to the problem of estimation of the response function in a Volterra system is given.

Keywords: Integral involving a cyclic product of kernels, cumulant, Young-Hölder inequality, cross-correlogram, asymptotic normality

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