

## Abstract

The semiparametric local Whittle or Gaussian estimate of the long memory parameter is known to have especially nice limiting distributional properties, being asymptotically normal with a limiting variance that is completely known. However in moderate samples the normal approximation may not be very good, so we consider a refined, Edgeworth, approximation, for both a tapered estimate, and the original untapered one. For the tapered estimate, our higher-order correction involves two terms, one of order  $m^{-1/2}$  (where  $m$  is the bandwidth number in the estimation), the other a bias term, which increases in  $m$ ; depending on their relative magnitude of the terms, one or the other may dominate, or they may balance. For the untapered estimate we obtain an expansion in which, for  $m$  increasing fast enough, the correction consists only of a bias term. We discuss a