

1083-60-164

**Indika P Wickramasinghe\*** ([indika.wickramasinghe@enmu.edu](mailto:indika.wickramasinghe@enmu.edu)), Mathematical Sciences, ENMU Station 18, 1500 S Ave K, Portales, NM 88130, and **Alex Trindade** ([alex.trindade@ttu.edu](mailto:alex.trindade@ttu.edu)), Dept of Mathematics & Statistics, Broadway and Boston, Lubbock, TX 79409. *Approximating the unit roots probabilities of the estimator of first order moving average model.*

We propose a method to approximate unit roots probabilities of the first order moving average model, MA (1) under the maximum likelihood estimator and the Gaussian distribution. The accuracy and the simplicity of the implementation are some of the advantages of this method. This proposed approach is based on saddlepoint approximation, which was introduced by Daniels in 1954. Under this method, the maximum likelihood (ML) estimator of the MA (1) parameter is expressed as a quadratic estimating equation (QEE). Monotone QEE whose unique root is the estimator of interest, the profiling out of nuisance parameters, and the accurate saddlepoint approximations to the cumulative distribution function (CDF) of the ML estimator are some of the key steps of the method. Results obtained are compared with the results presented by Cryer and Ledolter (1981) using a different approach. The extensions of this method for any sample size and for non-Gaussian case are considered. (Received August 27, 2012)