## ESTIMATION OF FAMILIAL CORRELATIONS UNDER AUTOREGRESSIVE CIRCULAR COVARIANCE

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## ABSTRACT

Circular covariance matrices play an important role in modeling phenomena in numerous epidemiological, communications and physical contexts. In this article, we propose a parsimonious, autoregressive type of circular covariance structure for modeling correlations between the "siblings" of a "family". This structure, similar to AR(1) structure used in time series models, involves only two parameters. We derive the maximum likelihood estimators of these parameters, and discuss testing of hypotheses about the autoregressive parameter. Estimation of "parent-sib" correlation, namely, the interclass correlation, is also considered. Estimation of the parameters when there are unequal numbers of siblings in different families is also discussed.