Accurate confidence intervals in regression analyses of non-normal data

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Abstract A linear model in which random errors are distributed independently and identically according to an arbitrary continuous distribution is assumed. Second- and third-order accurate confidence intervals for regression parameters are constructed from Charlier differential series expansions of approximately pivotal quantities around Student's *t* distribution. Simulation verifies that small sample performance of the intervals surpasses that of conventional asymptotic intervals and equals or surpasses that of bootstrap percentile-*t* and bootstrap percentile-|*t*| intervals under mild to marked departure from normality.

Keywords Bootstrap · Charlier differential series · Cornish-Fisher transformation · Edgeworth expansion · Kurtosis · One-sample *t* · Skewness