HYBRID CONDITIONAL PLOT OF GOODNESS-OF-FIT FOR GUMBEL DISTRIBUTION
(Plot Bersyarat Hibrid bagi Ujian Kebagusan Penyuaian untuk Taburan Gumbel)

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ABSTRACT

A Gumbel model is an extreme value model that describes the event of extreme behaviour. The Gumbel model has an exponential tail. Generally, the goodness-of-fit for the Gumbel model is evaluated by the graphical form of probability plot (PP) and quantiles plot (QQ). The model fits the observed values if the probability and the quantiles of the hypothetical distribution are linearly plotted against that of the observed values. However, the QQ plot is quite sensitive to the deviation at the tail of the plot, as opposed to the PP plot which is somewhat robust. Thus, distribution of extreme values is likely to deviate from the linear line at the tail of the QQ plot. An alternative approach of plotting the Gumbel model is given, in which the approach is expected to produce the linear plot. The conditional plot and stabilised plot are employed and the performances of both are compared. The plots are transformed into the hybrid plot so that the departures of the hypothetical quantiles values from the observed quantiles values are illustrated. The result shows that the hybrid conditional QQ plot is a better plot of goodness-of-fit for Gumbel model.

Keywords: Gumbel; QQ plot; conditional plot; stabilised plot; hybrid plot

ABSTRAK

Model Gumbel ialah sebuah model nilai ekstrem yang menerangkan sifat kejadian ekstrem. Model Gumbel mempunyai ekor eksponen. Secara umumnya, ujian kebagusan penyuaian bagi model Gumbel dinilai melalui bentuk gambar rajah plot kebarangkalian (PP) dan kuantil (QQ). Model ini adalah sesuai dengan nilai cerapan sekiranya kebarangkalian dan kuantil bagi taburan hipotesis diplotkan secara linear terhadap kebarangkalian dan kuantil daripada nilai cerapan. Walau bagaimanapun, plot QQ adalah sensitif terhadap sisihan pada ekor plot berbanding dengan plot PP yang agak teguh. Oleh itu, sebarang taburan yang mempunyai nilai ekstrem adalah cenderung untuk menyimpang dari garisan linear di bahagian ekor plot QQ. Pendekatan alternatif bagi model Gumbel diberikan, yang dengan pendekatan ini dijangkakan akan menghasilkan plot linear. Plot bersyarat dan plot stabil digunakan dan prestasi kedua-dua plot dibandingkan. Plot-plot ini diubah kepada plot hibrid supaya sisihan kuantil hipotesis daripada kuantil cerapan dapat digambarkan. Keputusan menunjukkan plot hibrid bersyarat adalah plot yang lebih bagus bagi ujian kebagusan penyuaian untuk taburan Gumbel.

Kata kunci: Gumbel; plot QQ; plot bersyarat; plot stabil; plot hibrid

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