

Performance evaluation of CT measurements made on step gauges using statistical methodologies - DTU Orbit (08/11/2017)

Performance evaluation of CT measurements made on step gauges using statistical methodologies

In this paper, a study is presented in which statistical methodologies were applied to evaluate the measurement of step gauges on an X-ray computed tomography (CT) system. In particular, the effects of step gauge material density and orientation were investigated. The step gauges consist of uni- and bidirectional lengths. By confirming the repeatability of measurements made on the test system, the number of required scans in the design of experiment (DOE) was reduced. The statistical model was checked using model adequacy principles; model adequacy checking is an important step in validating the applicability of a model to fitting experimental results. If the residuals after fitting the model are normally distributed (normality test), then the residuals represent random errors in the data. If the normality test is not satisfied, the model is said to fit the data poorly. If the model fit to the data were correct, the residuals would approximate the random errors (also called normality). The most common significance level is $\alpha = 0.05$; for normality to be satisfied, the P value for the residuals must not be smaller than 0.05. The initial results show that the residuals failed the normality test due to a small P value (P

General information

State: Published

Organisations: Department of Mechanical Engineering, Manufacturing Engineering, KU Leuven

Authors: Angel, J. (Intern), De Chiffre, L. (Intern), Kruth, J. (Ekstern), Tan, Y. (Ekstern), Dewulf, W. (Ekstern)

Pages: 68-72

Publication date: 2015

Main Research Area: Technical/natural sciences

Publication information

Journal: CIRP Journal of Manufacturing Science and Technology

Volume: 11

ISSN (Print): 1755-5817

Ratings:

BFI (2017): BFI-level 1

Web of Science (2017): Indexed yes

Scopus rating (2016): CiteScore 2.76 SJR 0.81 SNIP 1.991

Web of Science (2016): Indexed yes

Scopus rating (2015): SJR 0.953 SNIP 1.862 CiteScore 2.55

Web of Science (2015): Indexed yes

Scopus rating (2014): SJR 1.133 SNIP 1.777 CiteScore 2.46

Scopus rating (2013): SJR 0.95 SNIP 1.796 CiteScore 2.01

ISI indexed (2013): ISI indexed no

Scopus rating (2012): SJR 0.819 SNIP 1.822 CiteScore 1.69

ISI indexed (2012): ISI indexed no

Scopus rating (2011): SJR 0.946 SNIP 2.037 CiteScore 1.72

ISI indexed (2011): ISI indexed no

Scopus rating (2010): SJR 1.202 SNIP 2.299

Scopus rating (2009): SJR 0.837 SNIP 1.085

Original language: English

Computed tomography, Performance evaluation, Statistical methodologies

DOIs:

10.1016/j.cirpj.2015.08.002

Source: FindIt

Source-ID: 276873022

Publication: Research - peer-review › Journal article – Annual report year: 2015