Accepted Manuscript

Non-parametric Estimation of the Amplitude Ratio of Sinusoidal Signals with Common Frequency

Dušan Agrež, Tomaž Lušin

PII:	S0263-2241(14)00197-3
DOI:	http://dx.doi.org/10.1016/j.measurement.2014.04.039
Reference:	MEASUR 2846
To appear in:	Measurement
Received Date:	22 November 2013
Revised Date:	25 March 2014
Accepted Date:	23 April 2014



Please cite this article as: D. Agrež, T. Lušin, Non-parametric Estimation of the Amplitude Ratio of Sinusoidal Signals with Common Frequency, *Measurement* (2014), doi: http://dx.doi.org/10.1016/j.measurement.2014.04.039

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

1	Non-parametric Estimation of the Amplitude Ratio of Sinusoidal Signals with
2	Common Frequency
3	
4 5 6 7 8 9 10	Dušan Agrež Faculty of Electrical Engineering, University of Ljubljana Tržaška 25, 1001 Ljubljana, Slovenia Phone: +386 1 4768 220, Fax: +386 1 4768 426, E-mail: dusan.agrez@fe.uni-lj. Tomaž Lušin Metrel d.d.
11 12 13	Ljubljanska cesta 77, SI-1354 Horjul, Slovenia Phone: +386 31-278-503, E-mail: tomaz.lusin@siol.net
15	Abstract – The systematic bias error of the amplitude ratio estimation owed to leakage effect can
16	be effectively reduced by employment of the non-parametric multi-point interpolation of the discrete
17	Fourier transform in the quotient of amplitudes. Simple single-step algorithms for fast measurement
18	and estimation of the amplitude ratio of sinusoidal signals with the same frequency from two channels
19	are presented. The paper analyzes and compares the systematic bias errors and the noise error
20	behaviors of the amplitude ratio estimation changing the order of Rife-Vincent windows class I, which
21	are designed for maximization of the window spectrum side-lobe fall-off, and minimum side-lobe
22	level (MSL) windows, which are designed for minimization of the energy in the window spectrum
23	main lobe. Estimation errors are shown in relation to the number of signal cycles in the measurement
24	interval.
25	Keywords – Amplitude ratio, frequency domain, Rife-Vincent windows, MSL windows, leakage
26	effect, noise error.
27 1. Introduction	
28	Estimations of sinusoidal signal parameters are needed in many applications of measurement and
29	instrumentation. Estimation methods can be classified as parametric [1] and non-parametric [2],[3].
30	Parametric procedures are model-based and require computationally intensive algorithms to determine
31	the coefficients of the model that fits the available data. On the other hand, the model order issue does

Download English Version:

https://daneshyari.com/en/article/7125041

Download Persian Version:

https://daneshyari.com/article/7125041

Daneshyari.com