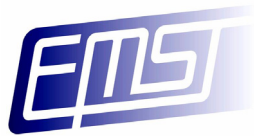


FOM for behavioural model comparison

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TOP AMPLIFIER RESEARCH GROUPS
IN A EUROPEAN TEAM

Outline

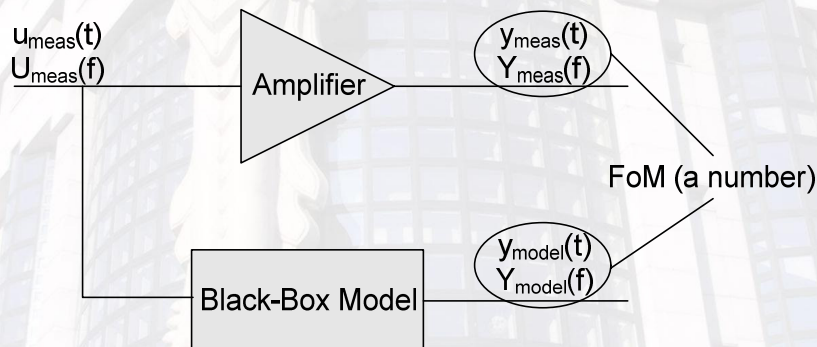
- 1 FOM definition
- 2 Common FOMs
- 3 Example
- 4 Discussion



FOM definition

Figures of Merit (FOM):

Used to measure how efficient a model is, which quality it has.



Common FOMs

Time domain based FOMs:

- ⊙ Normalised Mean Square Error (NMSE)
- ⊙ Variance Accounted For (VAF)
- ⊙ Distortion Error Vector Magnitude (DEVMM)
- ⊙ Differences in signal characteristics (e.g. CCDF, AMAM / AMPM,...)

Frequency domain based FOMs:

- ⊙ Adjacent Channel Error Power Ratio (ACEPR)
- ⊙ Power Spectral Density (PSD)
- ⊙ Coherence Function
- ⊙ Differences in signal characteristics (e.g. ACPR, IMD,...)

Example: LDMOS Amp. with WCDMA

Amplifier measurement:

3-stage Class AB amplifier

Motorola MRF 18090B

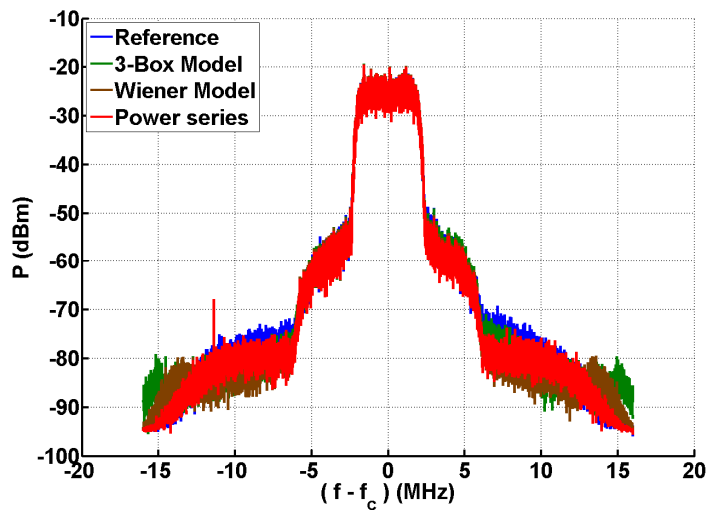
f_c : 1.96 GHz

Gain: 36 dB

P_{1dB} : 48 dBm

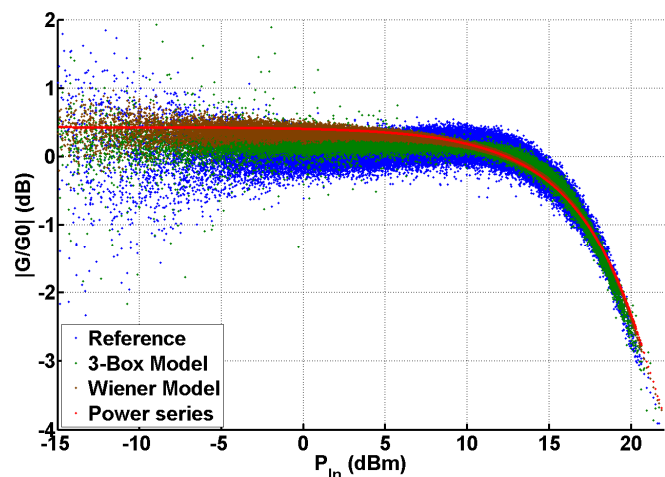
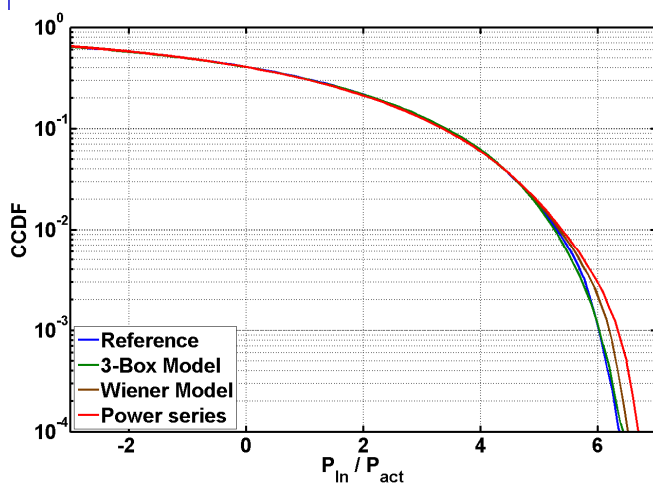
IP_3 : 53 dBm

$P_{out, WCDMA}$: 45 dBm



	3-Box Model	Wiener Model	Power Series
NMSE (dB)	-34.7	-33.4	-33.0

Example: LDMOS Amp. with WCDMA

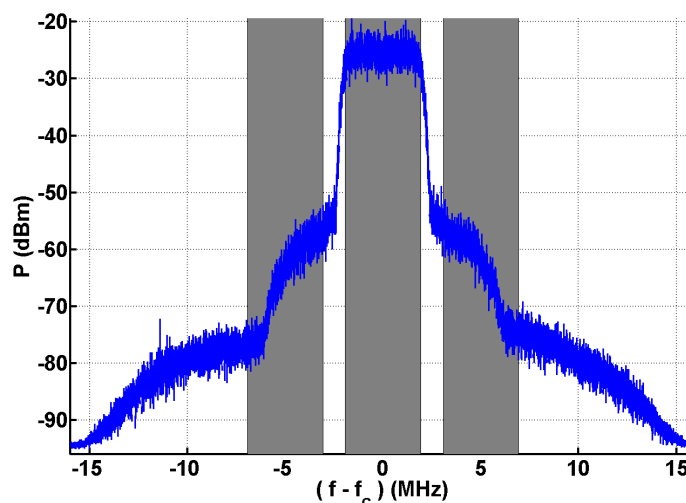


	3-Box Model	Wiener Model	Power Series
NMSE (dB)	-34.7	-33.4	-33.0

Example: LDMOS Amp. with WCDMA

Comparison of FOMs:

	3-Box Model	Wiener Model	Power Series
NMSE (dB)	-34.7	-33.4	-33.0
Δ ACPR _{Up} (dB)	-0.02	-0.05	-0.26
PSD _{Carrier} (dB)	-35.8	-35.3	-30.0
PSD _{Adj.CH,Up} (dB)	-12.5	-7.5	-6.9



Discussion

1. The classical FOMs (e.g. NMSE, Δ ACPR,...) seems unsuitable to represent the modelling accuracy for nonlinear dynamic models.

Is there a better FOM for this application?

Discussion

2. Is there a FOM which also considers the computational efficiency of the model extraction process and the number of parameters of the model?

**Thank you
for your attention!**

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