# Compensating a Power Amplifier using Iterative Learning Control : from Design to Realisation

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## Thank You Note

**Abstract**

# Contents

# Chapter 1

# Introduction

## 1.1 Why Digital Predistortion?

Power amplifiers are used in almost all wireless communication devices. They amplify the communication signal such that a good signal to noise ratio is obtained. They also are an important power consuming block in a communication chain. A power amplifier is often operated in a nonlinear operation mode to improve its efficiency. This nonlinear behavior should be compensated in a later step to reach the strict telecommunication requirements. A Digital Pre-Distortion (DPD) is a common technique to linearize the input-output behavior of a power amplifier. With DPD the input signal of the amplifier is modified such that the desired (i.e. linear) behavior is obtained.

## 1.2 Current Techniques of DPD

## 1.3 ILC

## 1.4 Using ILC for DPD

A nonlinear dynamic system can alternatively be represented by the combination of a linear transfer function $G_{BLA}$ and a nonlinear function F.

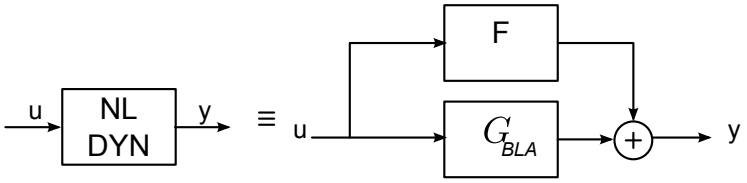


Figure 1.1: Alternative representations of a nonlinear system.

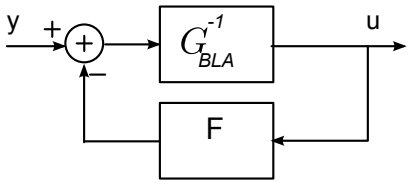


Figure 1.2: Switching the input and output, creating the inverse of the nonlinear system.

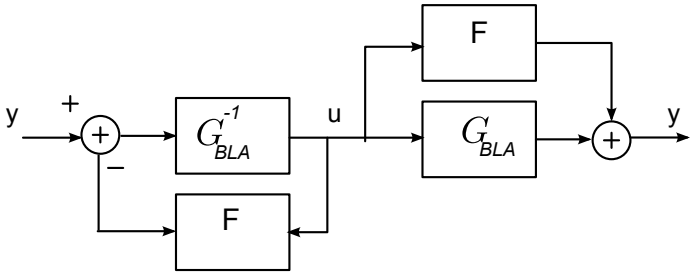


Figure 1.3: Connecting the inverse and the original system together.

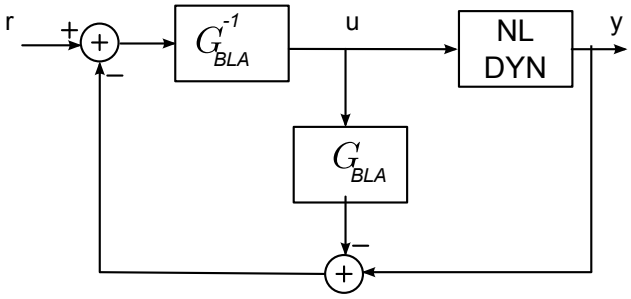


Figure 1.4: Getting creative with the blocks.

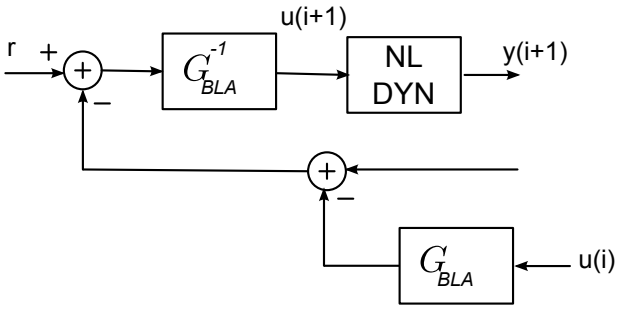


Figure 1.5: Cut the loop!

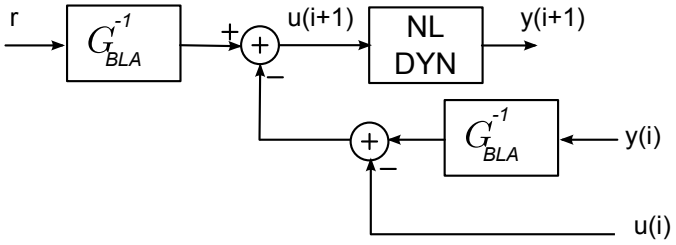


Figure 1.6: Reorganise the blocks one last time.

# Chapter 2

# Compensating with ILC using the BLA

# Chapter 3

# Estimating the DPD

# Chapter 4

# Results

# Bibliography

[1] J. Schoukens, R. Pintelon, Y. Rolain , *Mastering System Identification in 100 Exercises.* IEEE Press (2012), 183-238.