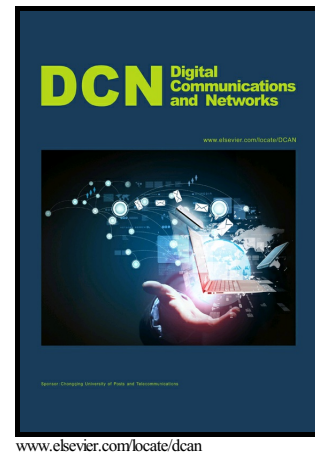


# Author's Accepted Manuscript

Piecewise Linear Detection for Direct Superposition Modulation

Martin Damrath, Peter Adam Hoehner, Gilbert J.M. Forkel



PII: S2352-8648(16)30110-9  
DOI: <http://dx.doi.org/10.1016/j.dcan.2016.11.005>  
Reference: DCAN70

To appear in: *Digital Communications and Networks*

Received date: 10 May 2016  
Revised date: 20 September 2016  
Accepted date: 21 November 2016

Cite this article as: Martin Damrath, Peter Adam Hoehner and Gilbert J.M. Forkel Piecewise Linear Detection for Direct Superposition Modulation, *Digital Communications and Networks*, <http://dx.doi.org/10.1016/j.dcan.2016.11.005>

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 galley proof before it is published in its final citable 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

# Piecewise Linear Detection for Direct Superposition Modulation

Martin Damrath\*, Peter Adam Hoehner, Gilbert J. M. Forkel

*Institute of Electrical and Information Engineering, Faculty of Engineering, University of Kiel, Kaiserstr. 2, 24143 Kiel, Germany*

---

## Abstract

Considering high-order digital modulation schemes, the bottleneck in consumer products is the detector rather than the modulator. The complexity of the optimal a posteriori probability (APP) detector increases exponentially with respect to the number of modulated bits per data symbol. Thus, it is necessary to develop low-complexity detection algorithms with an APP-like performance, especially when performing iterative detection, for example in conjunction with bit interleaved coded modulation. We show that a special case of superposition modulation, dubbed direct superposition modulation (DSM), is particularly suitable for complexity reduction at the receiver side. As opposed to square QAM, DSM is capacity achieving without active signal shaping. The main contribution is a low-cost detection algorithm for DSM, which enables iterative detection by taking a priori information into account. This algorithm exploits the approximate piecewise linear behavior of the soft outputs of an APP detector over the entire range of detector input values. A

---

\*Corresponding author

*Email addresses:* [md@tf.uni-kiel.de](mailto:md@tf.uni-kiel.de) (Martin Damrath), [ph@tf.uni-kiel.de](mailto:ph@tf.uni-kiel.de) (Peter Adam Hoehner), [gf@tf.uni-kiel.de](mailto:gf@tf.uni-kiel.de) (Gilbert J. M. Forkel)

Download English Version:

<https://daneshyari.com/en/article/7111705>

Download Persian Version:

<https://daneshyari.com/article/7111705>

[Daneshyari.com](https://daneshyari.com)