



Rényi entropy measure of noise-aided information transmission in a binary channel

Submitted by Emmanuel Lemoine on Thu, 01/30/2014 - 14:34

Titre	Rényi entropy measure of noise-aided information transmission in a binary channel
Type de publication	Article de revue
Auteur	Chapeau-Blondeau, François [1], Rousseau, David [2], Delahaies, Agnès [3]
Editeur	American Physical Society
Type	Article scientifique dans une revue à comité de lecture
Année	2010
Langue	Anglais
Date	2010/05/12
Numéro	5
Volume	81
Section	051112,1-10
Titre de la revue	Physical Review E
ISSN	1539-3755

Résumé en anglais

This paper analyzes a binary channel by means of information measures based on the Rényi entropy. The analysis extends, and contains as a special case, the classic reference model of binary information transmission based on the Shannon entropy measure. The extended model is used to investigate further possibilities and properties of stochastic resonance or noise-aided information transmission. The results demonstrate that stochastic resonance occurs in the information channel and is registered by the Rényi entropy measures at any finite order, including the Shannon order. Furthermore, in definite conditions, when seeking the Rényi information measures that best exploit stochastic resonance, then nontrivial orders differing from the Shannon case usually emerge. In this way, through binary information transmission, stochastic resonance identifies optimal Rényi measures of information differing from the classic Shannon measure. A confrontation of the quantitative information measures with visual perception is also proposed in an experiment of noise-aided binary image transmission.

URL de la notice	http://okina.univ-angers.fr/publications/ua1402 [4]
DOI	10.1103/PhysRevE.81.051112 [5]
Lien vers le document	http://dx.doi.org/10.1103/PhysRevE.81.051112 [5]

Liens

- [1] <http://okina.univ-angers.fr/f.chapeau/publications>
- [2] [http://okina.univ-angers.fr/publications?f\[author\]=1901](http://okina.univ-angers.fr/publications?f[author]=1901)
- [3] [http://okina.univ-angers.fr/publications?f\[author\]=1971](http://okina.univ-angers.fr/publications?f[author]=1971)
- [4] <http://okina.univ-angers.fr/publications/ua1402>

[5] <http://dx.doi.org/10.1103/PhysRevE.81.051112>

Publié sur *Okina* (<http://okina.univ-angers.fr>)