

Review Form 1.7

Journal Name:	Asian Journal of Probability and Statistics
Manuscript Number:	Ms_AJPAS_98390
Title of the Manuscript:	ON OPTIMAL CHANNEL CAPACITY THEOREMS VIA VERMA INFORMATION MEASURE WITH TWO-SIDED INPUT IN NOISY STATE
Type of the Article	Research Article

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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Review Form 1.7

PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<p>Compulsory REVISION comments</p> <p>1. Is the manuscript important for scientific community? (Please write few sentences on this manuscript)</p> <p>2. Is the title of the article suitable? (If not please suggest an alternative title)</p> <p>3. Is the abstract of the article comprehensive?</p> <p>4. Are subsections and structure of the manuscript appropriate?</p> <p>5. Do you think the manuscript is scientifically correct?</p> <p>6. Are the references sufficient and recent? If you have suggestion of additional references, please mention in the review form.</p> <p>7. Apart from above mentioned 6 points, reviewers are free to provide additional suggestions/comments)</p>	<p>1. <i>Coding Theory</i> constitutes one of the key technologies and important constituents for achieving reliable, efficient, and error-free transmission and storage of digital data. Coding is important to learn because it teaches important skills such as critical thinking, problem-solving, and creativity. Coding is also a skill that is valued in the workforce. Coding is important also for the future. Indeed, coding is an essential skill in the future because it is an important part of digital transformation. The number of jobs that require coding skills will grow exponentially because most services and products are being digitized.</p> <p>2. Yes.</p> <p>3. The abstract is comprehensive for insiders (I have personally worked in this field for several years). However, for an interested general reader the abstract is not attractively written as, in particular, it does not motivate the main reason why we need to investigate optimal channel capacity through Verna information measurement.</p> <p>4. The manuscript is not written in a pedagogical way. For instance,</p> <p>4a. The <u>channel capacity</u> is not defined (<i>Channel capacity is the maximum rate at which the data can be transmitted through a channel without errors. The fundamental theorem of information theory says that at any rate below channel capacity, an error control code can be designed whose probability of error is arbitrarily small. The capacity of a channel can be increased by increasing channel bandwidth as well as by increasing the signal-to-noise ratio. The formula of the channel capacity theorem reads: "In a recording code, m data bits are mapped into n code bits to give a code with rate $R=m/n$, where $mn \leq 1$. The maximum theoretical code rate is known as the capacity of the code"</i>).</p> <p>4b. The (fundamental) <u>channel coding theorem</u> has not been stated and briefly commented (<i>Given a noisy channel with capacity, C, and given $0 < \epsilon < 1$, there is a coding scheme that allows us to transmit information through the channel at a rate arbitrarily close to channel capacity, C, with a probability of error less than ϵ</i>).</p> <p>5. Yes, even if it would have been useful to take into account the results recently obtained by Verma (see ref. [4] in point 6. below).</p> <p>6. <i>The list of references is not exhaustive. By way of example only and without claiming completeness, I would suggest quoting also the following works:</i> [2] Chang Liu, Chuo Chang, and Zhe Chang, <i>Maximum Varma Entropy Distribution with Conditional Value at Risk Constraints</i>, MDPI-Entropy, 22(6), 663 (2020). https://doi.org/10.3390/e22060663. [2] Cover T. M., <i>Capacity Theorems for the Relay Channel</i>, IEEE, 59, 572 (1979). https://isl.stanford.edu/~cover/papers/transIT/0572cove.pdf [3] Varma, R.S. <i>Generalizations of Re'nyis entropy of order α</i>. J. Math. Sci., 1, 34. (1966). [4] Malhotra, G.; Srivastava, R.; Taneja, H.C., <i>Calibration of the risk-neutral density function by maximization of a two-parameter entropy</i>. Physica A, 513, 45 (2019). [5] Verma R. K., <i>Channel Capacity Enhancement on Maximization of Modified Verma and Bose-Einstein Entropies by Gaussian Distribution</i>, Recent Advances in Mathematical Research and Computer Science, 4, 70 (2021). https://doi.org/10.9734/bpi/ramrcs/v4/12064D</p> <p>7. <i>There are several gaps in this manuscript that should be filled. I shall limit myself to mentioning just a few of them.</i> 7a. Please ensure that all acronyms introduced in the manuscript have been duly specified when they first appear in the manuscript (e.g., please specify the acronym <i>GP</i> in the Introduction, etc.). 7b. For easy reference, it is advisable to insert a table where key <u>propaedeutic concepts</u>, like <i>channel capacity, discrete channel, information channel capacity, symmetric channels, weakly symmetric channels, binary erasure channels</i>, etc., are well defined. 7c. It would also be very instructive to explain the channel capacity is measured (<i>The capacity of the binary symmetric channel is $C = 1 - H(p)$ bits per transmission, and the capacity of the binary erasure channel is $C = 1 - \alpha$ bits per transmission</i>). 7d. The concept of memoryless channels is introduced in Theorem 2.1.1. However, the author mentioned this fundamental concept without providing its rigorous definition. Please, provide this definition (<i>A channel is said to be memoryless if the probability distribution of the output depends only on the input at that time and is conditionally independent of previous channel inputs or outputs</i>). 7e. A well-known generalization of Shannon's entropy is Varma's entropy. Varma entropy plays an important role as a measure of</p>	

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	complexity and uncertainty in different areas. For completeness, please, defines Varma's entropy (The Varma entropy is defined as: $H_{ab} = 1/(b-a) \ln \int_{-\infty}^{+\infty} p^{a+b-1}(x) dx$ where P is the <i>normalized probability density distribution</i>).	
Minor REVISION comments 1. Is language/English quality of the article suitable for scholarly communications?	1. Please check English; several typos were found.	
Optional/General comments	The work is interesting and deserves attention. However, it is written for "insiders" and, in my opinion, in its present form, is not appealing enough to the general reader interested in coding theory. I would therefore suggest taking the above suggestions into account.	

PART 2:

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Are there ethical issues in this manuscript?	(If yes, Kindly please write down the ethical issues here in details)	

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