

Neelesh S Upadhye

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Personal Information

Date of Birth: 06-December-1980
Age (in years): 33
Gender: Male

Marital Status: Married
Nationality: INDIAN

Education

Ph.D. Mathematics, Indian Institute of Technology Bombay, 2009.

Dissertation: Compound Negative Binomial Approximations to Sums of Random Variables

Supervisor: Professor P Vellaisamy

M.Sc. Mathematics, Indian Institute of Technology Bombay, 2003.

B.Sc. Mathematics, Wilson College Mumbai 2001.

Employment

Assistant Professor, Department of Mathematics, Indian Institute of Technology Madras, September 2012–present.

Quantitative Researcher, Dolat Investments Ltd., Mumbai, August 2009–September 2012.

Teaching Assistant, Department of Mathematics, Indian Institute of Technology Bombay, July 2003–July 2009.

Fields of Research Interest

Probabilistic Approximations, Compound Poisson and Compound negative binomial Approximations, Distribution Theory, Negative binomial perturbations and Poisson perturbations, Market Microstructure.

Computational Skills

Operating Systems: Windows NT/2K/XP/7, Linux/Unix.

Programming Skills: R, C++.

Databases: PostgreSQL.

Publications

Upadhye N. S., Vellaisamy, P. and Čekanavičius V. (2014). On Stein operators for discrete approximations. *Communicated*.

Vyas, A. N. and Upadhye, N. S. (2014). On tail behavior of functions of random variables. *Communicated*.

Publications in Refereed Journals

Upadhye N. S. and Vellaisamy, P. (2014). Compound Poisson approximation to convolutions of compound negative binomial variables. To appear in *Methodology and Computing in Applied Probability*.

Upadhye N. S. and Vellaisamy, P. (2013). Improved Bounds for the Approximation to Compound Distributions. *Statistics and Probability Letters*, **83**, 467-473.

Vellaisamy, P., Upadhye, N. S. and Čekanavičius V. (2013). On Negative Binomial Approximation. *Theory of Probability and its Applications*, **57**, 97-109.

Vellaisamy, P. and Upadhye, N. S. (2009). On the sums of compound negative binomial and gamma random variables. *Journal of Applied Probability*, **46**, 272-283.

Vellaisamy, P. and Upadhye, N. S. (2009). Compound negative binomial approximations for sums of random variables. *Probability and Mathematical Statistics*, **29**, 205-226.

Vellaisamy, P. and Upadhye, N. S. (2007). On the negative binomial distribution and its generalizations. *Statistics and Probability Letters*, **77**, 173-180.

Seminars

Compound Poisson approximation to sums of compound negative binomial variables. *Progress in Stein's method*, National University of Singapore, Singapore (2009).

Teaching Assistance

Department of Mathematics, IIT Bombay

Stochastic Processes
Probability Theory
Statistical Inference
Calculus-I/II
Linear Algebra.

Department of Mathematics, IIT Madras

Probability, Statistics and Stochastic Processes
Mathematical Statistics
Calculus
Probability Theory
Stochastic Methods in Industry
Applied Statistics

Awards and Honors

Senior Research Fellowship (SRF-CSIR) in Department of Mathematics, IIT Bombay-2008.

Junior Research Fellowship (JRF-CSIR) in Department of Mathematics, IIT Bombay-2006.

Senior Research Fellowship (SRF) in Department of Mathematics, IIT Bombay-2005.

Junior Research Fellowship (JRF) in Department of Mathematics, IIT Bombay-2003.

Graduate Aptitude Test in Engineering (GATE) 2003 (94.8 percentile).

Wilson College Trophy for Securing First rank in the college at undergraduate level -2001.

References

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Industrial Experience

I was serving “Dolat Capital Group” from August 2009 to September 2012 (three years) as “Quantitative Researcher” and carrying out the research in high-frequency finance. The research work done during this period is proprietary and can not be published. The important areas of my research are:

- Market Microstructure
- Time Series and Forecasting
- Statistical Arbitrage
- Technical Analysis
- High Frequency Trading

Research Proposal (Short Term)

So far my research has been heavily concentrated on negative binomial (NB) and compound negative binomial (CNB) approximations to sums of random variables. One can extend the research in the areas of signed measure approximations and process approximations to generalize the results obtained. So, I propose the following problems of research for the near future.

Using signed CNB measures, one can obtain the norm estimates of better order which may lead to improvements in the norm estimates obtained in our paper published in *Probability and Mathematical Statistics* (2009).

Method of Exponents is a method of asymptotic expansion of a measure into exponents which can be used to obtain the signed CNB approximations for the distributions naturally arising out of word patterns and hence some improvements can be given for the results obtained in the literature.

CreditRisk⁺ modeling naturally gives rise to some distributions which resemble the behavior of CNB distributions and hence it is important to obtain the error bounds for CNB and signed CNB approximations. This fact has not been emphasized in the literature. Therefore, one can emphasize the fact by proving the closeness of these measures to CNB and signed CNB measures.

Also, few known events, (for example, (k_1, k_2) -events, word patterns) can be approximated to NB and CNB distributions and estimates of optimal order can be achieved.

Further, the similar results can be extended for CNB Process approximations which opens up the new direction for research.

I am also collaborating with Professor Vydas Čekanavičius and Professor P Vellaisamy on the following problems which typically use Stein method for approximation of distributions.

Binomial approximation to (k_1, k_2) -runs

Unification of Steins Equation for Random Sums

Generator approach: Stein Equation

Bounds and order of approximation.

These results are helpful in solving some of the interesting problems in actuarial sciences, telecommunication networks, risk theory, graph theory, insurance mathematics, reliability and several other related areas of research.