

REPORT ON THE SABBATICAL LEAVE (2009, Spring)
By Iosif Pinelis

Much of the mentioned period, I was working with Ph.D. students Elena “Lena” Kasyanova and Raymond “Ray” Molzon -- especially with Lena, on a long (over 40 pages) and difficult paper. The work on this paper was almost finished in May 2009. Essentially, all that remained to do was to write an introduction and do one final check – and then Lena just disappeared, the second time as the graduate student here. With Ray, we worked mainly on two papers, which were afterwards submitted.

Also during the leave, I completed the revision of a very long and logically complicated paper, “Optimal two-value zero-mean disintegration of zero-mean random variables”, which was published in one of the topmost journals in the field, *Electronic Journal of Probability*, Vol. 14 (2009), Paper 26, 663--727. I think that usually the difficulty of the paper can be measured by the number of logical connections in it, which is roughly proportional to the number of pairs of objects in the paper, which in turn is roughly proportional to the square of the length of the paper. So, a paper twice as long as another paper in the same journal can be counted as requiring roughly 4 times as much work.

During the same period, I completed and posted on preprint server arXiv another very long and arguably one of the few very best papers I have ever produced, “On the Bennett-Hoeffding inequality”. The paper has been very popular – there have been (at least) 15 downloads of it; for some reason, they do not count downloads from the US. In comparison, there have been on the average 5.6 downloads per paper on arXiv for an about 28 papers that were posted on arXiv in 2008—09 and then published in the top journal *The Annals of Probability* (AoP) in 2009; it may take more than a year or two for a paper to be published in the AoP. Only two papers of the 28 had larger numbers of downloads (19 and 16) than “my” number 15. This paper is now under consideration in the AoP. It was presented as invited talks at the conference “Advances in Stochastic Inequalities and their Applications” on June 12, 2009 in Banff, Canada, and at a joint seminar of the Departments of Mathematics and Statistics of Columbia University on October 23, 2009.

An offshoot of this paper, which provided a tool needed in a certain part of it, was another paper produced during the same period -- “Positive-part moments via the Fourier-Laplace transform”. This paper is also interesting on its own, with a numbers of further applications. It has been accepted for publication in *Journal of Theoretical Probability* and is expected to be published within a week.

Other papers posted on arXiv during the same period and then submitted are “Berry-Esseen bounds for general nonlinear statistics, with applications to Pearson's and non-central Student's and Hotelling's” (33 pages, with R. Molzon) and “Exponential deficiency of convolutions of densities”. Another paper with Ray, “Monotonicity properties of the asymptotic relative efficiency between common correlation statistics in

the bivariate normal model”, was completed and posted on arXiv a bit later, in July 2009; it is submitted as well, to *Mathematical Methods in Statistics*.

Work on another six papers began or continued during the sabbatical period. Three of this papers, on closely related questions concerning the asymptotic efficiency of statistical tests, are about to be completed; one of these three papers is especially long (now 59 pages) and difficult.

All the mentioned work was within the NSF funded project (DMS-0805946).

Since I began working at MTU in 1992, I have had about 3 publications per year on the average, in recent years a bit more than that. This makes it about 1.5 papers/semester. As I was freed during the sabbatical semester of my teaching and service duties (counting as 55—60% of the total load), this relief would account for about $1.5 \times 0.60 \approx 1$ extra paper, of average length and difficulty. Clearly, such an expectation was exceeded by far.