MR3772186 60E05 33C47 42A61 60E15 62E15
Afendras, Georgios [**Afendras, Giorgos**] (1-SUNYB-DBS);
Balakrishnan, Narayanaswamy (3-MMAS-MS);
Papadatos, Nickos (GR-UATH-OR)
Orthogonal polynomials in the cumulative Ord family and its application to variance bounds. (English summary)
Statistics **52** (2018), *no. 2,* 364–392.

MR3731289 62G30 44A60 60E05
Papadatos, Nickos (GR-UATH-OR)
On sequences of expected maxima and expected ranges. (English summary)
J. Appl. Probab. **54** (2017), *no. 4,* 1144–1166.

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Lett. **47**, 295–300. MR1747490
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MR3684652 60C05 60B10
Afendras, G. **[Afendras, Giorgos]** (1-SUNYB-DBS);
Papadatos, N. **[Papadatos, Nickos]** (GR-UATH)
A factorial moment distance and an application to the matching problem. (Russian summary)
Teor. Veroyatn. Primen. **62** (2017), *no. 3,* 617–628.

MR3506660 62G30 60E15 62E10
Papadatos, Nickos (GR-UATH-OR)
Maximizing the expected range from dependent observations under mean-variance information. (English summary)
Statistics **50** (2016), *no. 3,* 596–629.

This paper discusses best expectation bounds for the range based on a collection of random variables. This problem may be considered as a special case of finding best upper bounds for linear functions of order statistics in terms of means and variances. Let $L=\sum_{i=1}^{n} c_i X_{i:n}$, for some constants c_i, denote such a linear function of order statistics, that is, an L-statistic. A particular special case of this type of problem has been considered by R. L. Plackett [Biometrika **34** (1947), 120–122; MR0019282], E. J. Gumbel [Ann. Math. Statistics **25** (1954), 76–84; MR0060776], and H. O. Hartley and H. A. David [Ann. Math. Statistics **25** (1954), 85–99; MR0060775], among others. They derived the following inequality for the sample range based on independent and identically distributed (i.i.d.) random variables:

$$\mathbb{E}\left[\max_{1\le i\le n}\{X_i\}-\min_{1\le i\le n}\{X_i\}\right]\le n\sigma\sqrt{\frac{2}{2n-1}\left(1-\frac{1}{\binom{2n-2}{n-1}}\right)}.$$

Here σ^2 is the common variance of the random variables X_i. The best possible bound may be expressed as follows: For any given values of $\mu\in\mathbf{R}$ and $\sigma\in(0,\infty)$ there exist n i.i.d. random variables with the given mean and variance that attain the equality.

One related problem that is considered in the literature is to drop the assumptions of independence and/or identical distributions of observations, and also extend the results to any L-statistic. For example, when both assumptions are dropped, B. C. Arnold and R. A. Groeneveld [Ann. Statist. **7** (1979), no. 1, 220–223; MR0515696; correction, Ann. Statist. **8** (1980), no. 6, 1401; MR0594659] obtained an upper bound for $\mathbb{E}L$. On the other hand, when the random variables X_i are assumed identically distributed (but not necessarily independent) the best possible bound for $\mathbb{E}L$ was established by T. Rychlik [Comm. Statist. Theory Methods **22** (1993), no. 4, 1053–1068; MR1225236; corrigendum, Comm. Statist. Theory Methods **23** (1994), no. 1, 305–306; MR1261748].

In this paper, the author extends the techniques of T. L. Lai and H. Robbins [Proc. Natl. Acad. Sci. USA **73** (1976), no. 2, 286–288] and of D. J. Bertsimas, K. Natarajan and C.-P. Teo [Probab. Engrg. Inform. Sci. **20** (2006), no. 4, 667–686; MR2265254] in order to obtain the best possible upper bound for the expected range. In addition, the vectors that attain the equality in the bound are characterized. *Güvenç Arslan*

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MR3422115 60E05 33C45 62E15

Afendras, G. **[Afendras, Giorgos]** (1-SUNYB-DBS);
Papadatos, N. **[Papadatos, Nickos]** (GR-UATH-OR)

Integrated Pearson family and orthogonality of the Rodrigues polynomials: a review including new results and an alternative classification of the Pearson system. (English summary)

Appl. Math. (Warsaw) **42** (2015), *no. 2-3,* 231–267.

Summary: “An alternative classification of the Pearson family of probability densities is related to the orthogonality of the corresponding Rodrigues polynomials. This leads to a subset of the ordinary Pearson system, the so-called *Integrated Pearson Family.* Basic properties of this family are discussed and reviewed, and some new results are presented. A detailed comparison between the Integrated Pearson Family and the ordinary Pearson system is presented, including an algorithm that enables one to decide whether a given Pearson density belongs, or not, to the integrated system. Recurrences between the derivatives of the corresponding orthonormal polynomials are also given.”

MR3195925 30H50 30E10
Nestoridis, V. [**Nestoridis, Vassili**] (GR-UATH);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH)
An extension of the disc algebra, II. **(English summary)**
Complex Var. Elliptic Equ. **59** (2014), *no. 7,* 1003–1015.

The paper under review can be considered a continuation of previous work of the first author [Bull. Lond. Math. Soc. **44** (2012), no. 4, 775–788; MR2967245]. Now a different extension of the disk algebra is studied. *Jordi Pau*

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MR3173085 62H20 60E15
Papadatos, Nickos (GR-UATH-OR)
Some counterexamples concerning maximal correlation and linear regression. **(English summary)**
J. Multivariate Anal. **126** (2014), 114–117.

Summary: "A class of examples concerning the relationship of linear regression and maximal correlation is provided. More precisely, these examples show that if two random variables have (strictly) linear regression on each other, then their maximal correlation is not necessarily equal to their (absolute) correlation."

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AMERICAN MATHEMATICAL SOCIETY
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Mathematical Reviews

MR3160581 60E15
Afendras, G. [**Afendras, Giorgos**] (GR-UATH-OR);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH-OR)
Strengthened Chernoff-type variance bounds. (English summary)
Bernoulli **20** (2014), *no. 1,* 245–264.

The authors establish bounds for the variance of an absolutely continuous random variable from the integrated Pearson family. Let $X \sim \mathrm{IP}(\mu,\delta,\beta,\gamma)$, and denote by (α,ω) the support of X and by $q(x)$ its quadratic polynomial; $q(x) = \delta x^2 + \beta x + \gamma$, with $\delta,\beta,\gamma \in \mathbb{R}$, $|\delta| + |\beta| + |\gamma| > 0$. For a fixed integer $n \geq 1$, let $\mathcal{H}^n(X)$ be the class of functions $g\colon (\alpha,\omega) \to \mathbb{R}$ satisfying the following conditions:

- $g \in C^{n-1}(\alpha,\omega)$; that is, the function $g^{(n-1)}\colon (\alpha,\omega) \to \mathbb{R}$ with
$$g^{(n-1)}(x) = \frac{d^{n-1}g(x)}{dx^{n-1}}, \quad \alpha < x < \omega,$$
is absolutely continuous in (α,ω) with a.s. derivative $g^{(n)}$ such that
$$g^{(n-1)}(y) - g^{(n-1)}(x) = \int_x^y g^{(n)}(t)dt,$$
for every compact interval $[x,y] \subseteq (\alpha,\omega)$;
- $\mathbb{E}q^n(X)(g^{(n)}(X))^2 < \infty$.

The main result is as follows: If $X \sim \mathrm{IP}(\mu,\delta,\beta,\gamma)$, with $\delta \leq 0$ and if $g \in \mathcal{H}^n(X)$ for some $n \in \{1,2,\dots\}$, then

$$\mathrm{Var}(g(X)) \le \sum_{k=1}^{n} \frac{(\mathbb{E}q^k(X)g^{(k)}(X))^2}{k!\mathbb{E}q^k(X)\prod_{j=k-1}^{2k-2}(1-j\delta)} + \frac{\mathbb{E}q^n(X)(g^{(n)}(X))^2}{(n+1)!\prod_{j=n}^{2n-1}(1-j\delta)} - \frac{1}{(n+1)!\prod_{j=n}^{2n-1}(1-j\delta)} \frac{(\mathbb{E}q^n(X)g^{(n)}(X))^2}{\mathbb{E}q^n(X)},$$

with equality if and only if g is a polynomial of degree at most $n+1$.

In particular, if $\sigma^2 = \mathrm{Var}(X)$ and $g \in \mathcal{H}^1(X)$, then

$$\mathrm{Var}(g(X)) \le \left(1 - \frac{1}{2(1-\delta)}\right)\frac{1}{\sigma^2}(\mathbb{E}q(X)g'(X))^2 + \frac{1}{2(1-\delta)}\mathbb{E}q(X)(g'(X))^2,$$

with equality if and only if g is a polynomial of degree at most two.

Broderick O. Oluyede

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Multivariate Anal. **12** 306–315. MR0661566 MR0661566
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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

MR3054093 62H20 60E05 60E15 62E10 62G30
Papadatos, Nickos (GR-UATH-OR); **Xifara, Tatiana** (GR-UATH-OR)
A simple method for obtaining the maximal correlation coefficient and related characterizations. (English summary)
J. Multivariate Anal. **118** (2013), 102–114.

The authors identify conditions under which the maximal correlation coefficient of a bivariate distribution can be simply calculated. They show that the method applies to the bivariate normal distribution, as well as to order statistics and record values. They also provide a new characterization of the exponential distribution under a splitting model on independent and identically distributed observations. In particular, they extend a characterization of V. B. Nevzorov [Math. Methods Statist. **1** (1992), 49–54; MR1202799].

Moshe Shaked

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MR2998717 60E05 60G09
Cacoullos, Theophilos (GR-UATH-OR); **Papadatos, Nickos** (GR-UATH-OR)
Self-inverse and exchangeable random variables. (English summary)
Statist. Probab. Lett. **83** (2013), *no. 1,* 9–12.

Summary: "A random variable Z will be called self-inverse if it has the same distribution as its reciprocal Z^{-1}. It is shown that if Z is defined as a ratio, X/Y, of two rv's X and Y (with $\mathbb{P}[X=0]=\mathbb{P}[Y=0]=0$), then Z is self-inverse if and only if X and Y are (or can be chosen to be) exchangeable. In general, however, there may not exist iid X and Y in the ratio representation of Z."

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MR2887565 62G05 62G30 62G32 62N01
Papadatos, Nickos (GR-UATH-OR)
Linear estimation of location and scale parameters using partial maxima. (English summary)
Metrika **75** (2012), *no. 2,* 243–270.

Summary: "Consider an i.i.d. sample $X_1^*, X_2^*, \ldots, X_n^*$ from a location-scale family, and assume that the only available observations consist of the partial maxima (or minima) sequence, $X_{1:1}^*, X_{2:2}^*, \ldots, X_{n:n}^*$, where $X_{j:j}^* = \max\{X_1^*, \ldots, X_j^*\}$. This kind of truncation appears in several circumstances, including best performances in athletics events. In the case of partial maxima, the form of the BLUEs (best linear unbiased estimators) is quite similar to the form of the well-known Lloyd's BLUEs [see E. H. Lloyd, Biometrika **39** (1952), 88–95; MR0048759], based on (the sufficient sample of) order statistics, but, in contrast to the classical case, their consistency is no longer obvious. The present paper is mainly concerned with the scale parameter, showing that the variance of the partial maxima BLUE is at most of order $O(1/\log n)$, for a wide class of distributions."

AMERICAN MATHEMATICAL SOCIETY
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Citations	From References: 1	From Reviews: 0

MR2817368 (2012h:60062) 60E15 15A45
Afendras, G. [**Afendras, Giorgos**] (GR-UATH-OR);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH-OR)
On matrix variance inequalities. (English summary)
J. Statist. Plann. Inference **141** (2011), *no. 11,* 3628–3631.

Summary: "I. Olkin and L. A. Shepp [J. Statist. Plann. Inference **130** (2005), no. 1-2, 351–358; MR2128013] presented a matrix form of Chernoff's inequality for Normal and Gamma (univariate) distributions. We extend and generalize this result, proving Poincaré-type and Bessel-type inequalities, for matrices of arbitrary order and for a large class of distributions."

AMERICAN MATHEMATICAL SOCIETY
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Citations	From References: 9	From Reviews: 0

MR2787602 (2012i:60028) 60E05 42C05
Afendras, G. [**Afendras, Giorgos**] (CY-CYP-MS);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH-OR);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH-OR)
An extended Stein-type covariance identity for the Pearson family with applications to lower variance bounds. (English summary)
Bernoulli **17** (2011), *no. 2,* 507–529.

For a random variable X with density f, mean μ and variance σ^2, and for g an absolutely continuous real function, it can be established that $\mathrm{Cov}(X, g(X)) = \sigma^2 E[g'(X^*)]$, with

X^* having density $f^*(x) = \frac{1}{\sigma^2}\int_{-\infty}^{x}(\mu - t)f(t)dt$. On the other hand, the Pearson family is characterized by the fact that there exists a quadratic function $q(x) = \delta x^2 + \beta x + \gamma$ such that $\int_{-\infty}^{x}(\mu - t)f(t)dt = q(x)f(x)$. Let $P_k(x) = \frac{(-1)^k}{f(x)}\frac{d^k}{dx^k}[q^k(x)f(x)]$, $r \le x \le s$, $k = 0, 1, \dots, M$.

The authors establish the following results:

(a) If X has $2k-1$ finite moments ($k \ge 1$) then

$$q^k(x)f(x) = \frac{(-1)^k}{(k-1)!}\int_r^x (x-y)^{k-1}P_k(y)f(y)dy.$$

(b) If X has $2k$ finite moments and $Eq^k(X)|g^{(k)}(X)| < \infty$, then $E[|P_k(X)g(X)|] < \infty$ and the covariance identity

$$E|P_k(X)g(X)| = E[q^k(X)g^{(k)}(X)] < \infty$$

holds. Here, $g^{(k)}$ denotes the k-th derivative of g. The last identity can be extended, with $g(X)$ on the left-hand side replaced by $G(X) = \frac{1}{(k-1)!}\int_\rho^x (x-y)^{k-1}g^{(k)}(y)dy$, where ρ is appropriately chosen.

(c) We also have a lower bound for the variance:

$$\operatorname{Var}[g(X)] \ge \sum_{k=1}^{n}\frac{E^2[q^k(X)g^{(k)}(X)]}{k!E[q^k(X)]\prod_{j=k-1}^{2k-2}(1-j\delta)},$$

$\delta \notin \{1, 1/2, \dots, 1/(2n-2)\}$ if $n \ge 2$.

The authors give further interesting representations of the variance and covariance.

Thu Pham-Gia

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MR2428867 (2009h:60038) 60E15

Afendras, G. [**Afendras, Giorgos**] (GR-UATH-OR);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH-OR);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH-OR)

The discrete Mohr and Noll inequality with applications to variance bounds. (English summary)

Sankhyā **69** (2007), *no. 2,* 162–189.

Summary: "In this paper, we provide Poincaré-type upper and lower variance bounds for a function $g(X)$ of a discrete integer-valued random variable X, in terms of the (forward) differences of g up to some order. To this end, we investigate a discrete analogue of the Mohr and Noll inequality [E. Mohr and W. Noll, Math. Nachr. **7** (1952), 55–59; MR0047086], which may be of some independent interest in itself. It has been shown by R. W. Johnson [Statist. Decisions **11** (1993), no. 3, 273–278; MR1257861] that for the commonly used absolutely continuous distributions that belong to the Pearson family, the somewhat complicated variance bounds take a very pleasant and simple form. We show here that this is also true for the commonly used discrete distributions. As an application of the proposed inequalities, we study the variance behaviour of the UMVU estimator of $\log p$ in geometric distributions."

MR2412835 (2009d:62069) 62G30
Papadatos, Nickos (GR-UATH-OR)
★**On Rychlik's expectation bound for L-estimates based on identically distributed variates. (English summary)**
Recent developments in ordered random variables, 39–53, *Nova Sci. Publ.*, *New York*, 2007.

Summary: "We provide an alternative proof of the best possible inequality on the expectation of any linear combination of order statistics based on dependent samples with identical marginals, originally proved by T. Rychlik [Statistics **24** (1993), no. 1, 1–7; MR1238259], and we present a generalization."
{For the collection containing this paper see MR2412853}

MR2202348 (2007b:62019) 62E10
Papadatos, Nickos (GR-UATH-OR)
Characterizations of discrete distributions using the Rao-Rubin condition. (English summary)
J. Statist. Plann. Inference **135** (2005), *no. 1,* 222–228.

The author considers the multivariate splitting model $N = N_1 + N_2 + \cdots + N_k$, where $N_1, N_2, \ldots, N_k$, $k \geq 3$, are arbitrary (not necessarily independent) random variables taking values in $\mathbb{N}$, the set of all non-negative integers. Assuming that: (i) the Rao-Rubin condition is satisfied for N_1 and N_2, i.e.,

$$P(N_2 = n_2|N_1 = 0) = P(N_2 = n_2), \quad n_2 \in \mathbb{N},$$

(ii) the conditional distribution of the vector $(N_1, N_2, \ldots, N_k)$ given N is of convolution type, the author presents an alternative set of conditions (to the one given by C. R. Rao and R. C. Srivastava [Sankhyā Ser. A **41** (1979), no. 1-2, 124–128; MR0615046]) characterizing the distribution of N. The result is then applied to certain discrete distributions.
G. Hossein G. Hamedani

MR2190195 62E10 60E05

Charalambides, Ch. A. [**Charalambides, Charalambos A.**] (GR-UATH);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH)

★**The q-factorial moments of discrete q-distributions and a characterization of the Euler distribution.** **(English summary)**

Advances on models, characterizations and applications, 57–71, *Stat. Textb. Monogr.*, 180, *Chapman & Hall/CRC*, *Boca Raton*, *FL*, 2005.

{For the collection containing this paper see MR2188503}

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MR2080368 (2005j:62113) 62G30 60C05 60E15

Papadatos, N. [**Papadatos, Nickos**] (GR-UATH);
Rychlik, T. [**Rychlik, Tomasz**] (PL-PAN)

Bounds on expectations of L-statistics from without replacement samples. **(English summary)**

J. Statist. Plann. Inference **124** (2004), *no. 2,* 317–336.

Let $\Pi = \{x_1 \le \cdots \le x_N\}$ be an ordered population, $X_1, \ldots, X_n$ be a simple random sample drawn without replacement from Π and $X_{1:n}, \ldots, X_{n:n}$ be the corresponding order statistics. Extending the results of [N. Balakrishnan, C. A. Charalambides and N. Papadatos, J. Statist. Plann. Inference **113** (2003), no. 2, 569–588; MR1965129], the authors obtain sharp lower and upper expectation bounds for any L-statistic of the form $L = L(c_1, \ldots, c_n) = \sum_{i=1}^n c_i X_{i:n}$ in terms of the arbitrary real coefficients c_i, the population mean and the central absolute moments of various orders. The results are used to obtain bounds for trimmed means and quasi-ranges when the population mean and a given absolute central moment are fixed. Numerical results are presented.

Sreenivasan Ravi

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Citations	From References: 19	From Reviews: 0

MR2062823 (2005a:62163) 62J10 62E20 62F05

Akritas, M. G. [**Akritas, Michael G.**] (1-PAS-S);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH-OR)

Heteroscedastic one-way ANOVA and lack-of-fit tests. **(English summary)**

J. Amer. Statist. Assoc. **99** (2004), *no. 466,* 368–382.

This article is concerned with the asymptotic behavior of the one-way analysis of variance F statistic and variations in the unbalanced case assuming independent observations when the number of levels or groups is large. Previous work assumed homoscedasticity; this article considers the heteroscedastic case. A weighted test statistic is shown to have a valid asymptotic approximation only if the group sample sizes tend to infinity suitably fast, and simulation results indicate that the group sample sizes have to be quite large before the approximation gives good results. A new unweighted test statistic has an asymptotic approximation that is useful even with small group sizes. It has advantages over the usual F-statistic even in the homoscedastic case with unequal sample sizes, since the distributional assumptions are weaker. The method is related to lack-of-fit tests for constant regression using smoothing techniques when there are no replications. The asymptotic theory uses a novel application of the projection principle applied to quadratic forms. *Juliet Popper Shaffer*

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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

Citations	From References: 0	From Reviews: 1

MR2028902 (2004i:62105) 62H05 60E15 62G30
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH)
Multivariate covariance identities with an application to order statistics.
(English summary)
Sankhyā **65** (2003), *no. 2,* 307–316.

The authors present some general multivariate covariance identities, which are generalizations of A. F. Siegel's identity [J. Amer. Statist. Assoc. **88** (1993), no. 421, 77–80; MR1212479] and extend the results of W. Wang, S. K. Sarkar and Z. Bai [J. Multivariate Anal. **59** (1996), no. 2, 308–316; MR1423737] to a wider class of distributions. Some characterizations of distributions through these identities are provided, as well as upper and lower variance bounds for linear estimators based on normal order statistics.
Roger B. Nelsen

Citations	From References: 4	From Reviews: 0

MR1971837 (2004c:60041) 60E15 60E10
Cacoullos, T. [**Cacoullos, Theophilos**] (GR-UATH);
Papadatos, N. [**Papadatos, Nickos**] (CY-CYP);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH)
An application of a density transform and the local limit theorem.
(English. Russian summary)
Teor. Veroyatnost. i Primenen. **46** (2001), *no. 4,* 803–810; *translation in Theory Probab. Appl.* **46** (2003), *no. 4,* 699–707.

This paper is a continuation of an earlier work by the second and the third authors [Teor. Veroyatnost. i Primenen. **40** (1995), no. 3, 685–694; MR1402000]. For a random variable X with density f_X, mean μ_X, and variance σ_X^2, let X^* be a random variable whose density is given by

$$f_{X^*}(x) = \frac{1}{\sigma_X^2} \int_{-\infty}^{x} (\mu_X - t) f_X(t) dt.$$

Let Y be another random variable, and suppose that $\{x\colon\ f_Y(x) > 0\} = (a, b)$, $-\infty \le a < b \le \infty$. The authors obtain the following upper bound on the total variation distance between X and Y:

$$d_{\mathrm{TV}}(X, Y) \le 2 \int_a^b \left| f_X(x) - \frac{\sigma_X^2 f_Y(x)}{\sigma_{Y^*}^2 f_{Y^*}(x)} f_{X^*}(x) \right| dx + 2 \frac{|\mu_x - \mu_Y|}{E|Y - \mu_Y|}.$$

As an illustration, they obtain a simple proof of the fact that if (X_i) is a sequence of i.i.d. absolutely continuous random variables with mean zero and variance 1, then

$$d_{\mathrm{TV}} \left(\frac{S_n}{\sqrt{n}, N(0,1)} \right) \longrightarrow 0, \quad \text{as } n \to \infty.$$

Pawel Hitczenko

MR1965129 (2004e:60068) 60G30 60E15
Balakrishnan, N. [**Balakrishnan, Narayanaswamy**] (3-MMAS-MS);
Charalambides, C. [**Charalambides, Charalambos A.**] (GR-UATH);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH)

Bounds on expectation of order statistics from a finite population. (English summary)

J. Statist. Plann. Inference **113** (2003), *no. 2,* 569–588.

This paper gives, amongst other things, certain bounds for the expectations of the order statistics and the sample range, relative to a random sample taken without replacement from a finite ordered population. *D. N. Shanbhag*

MR1929600 (2003g:60043) 60F05 60E15
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH-OR);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH-OR)
Poisson approximation for a sum of dependent indicators: an alternative approach. **(English summary)**
Adv. in Appl. Probab. **34** (2002), *no. 3,* 609–625.

In this paper the authors consider the Poisson approximation for sums of dependent indicators. They first discuss the Chen-Stein method of Poisson approximation and give a brief history of this method. They quote the classical Chen-Stein upper bound for the total variation distance between the sums of negatively related (NR) indicators and a Poisson random variable [A. D. Barbour, L. Holst and S. Janson, *Poisson approximation*, Oxford Univ. Press, New York, 1992; MR1163825]. This kind of bound has already been studied by the second author and S. A. Utev [Siberian Adv. Math. **5** (1995), no. 1, 120–132; MR1388807], the authors [Teor. Veroyatnost. i Primenen. **40** (1995), no. 3, 685–694; MR1402000] and M. Majsnerowska [Appl. Math. (Warsaw) **25** (1998), no. 3, 387–392; MR1637762]. The novelty of the results in this paper is the unification of the alternative method for the Poisson approximation. The authors present a general unified upper bound for the total variation distance between any nonnegative integer-valued random variable with finite variance and a Poisson random variable. Moreover, they introduce a notion of totally negative dependence (TND) and show that negatively related (NR) indicators are always TND; then they obtain the upper bound under the TND assumption. The authors apply the above results to a generalized birthday problem and present some equivalent conditions for the existence of monotone couplings of random vectors which imply a strong relationship between the TND property and some existing results. *Halina Hebda-Grabowska*

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534–545. MR0428387
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21. Papathanasiou, V. and Utev, S. A. (1995). Integro-differential inequalities and the Poisson approximation. *Siberian Adv. Math.* **5**, 138–150. MR1388807
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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

MR1910924 (2003c:62095) 62G30
Balakrishnan, N. [**Balakrishnan, Narayanaswamy**] (3-MMAS-MS);
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH-OR)

The use of spacings in the estimation of a scale parameter. (English summary)

Statist. Probab. Lett. **57** (2002), *no. 2,* 193–204.

Summary: "Linear functions on spacings—instead of linear functions on order statistics—are considered, in order to simplify the form of best linear unbiased estimators (BLUEs) and best linear invariant estimators (BLIEs) for the scale parameter in the classical location-scale family. Also, a sufficient condition for the non-negativity of the scale estimator is presented and, moreover, necessary and sufficient conditions for the BLUE (and the BLIE) to be a constant multiple of the sample range are derived. Finally, a modification of this approach is applied in order to simplify the derivations of both the location and the scale estimators in the uniform Type-II censored model."

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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

MR1857867 (2002i:62103) 62G30
Papadatos, Nickos (GR-UATH-OR)
Distribution and expectation bounds on order statistics from possibly dependent variates. (English summary)
Statist. Probab. Lett. **54** (2001), *no. 1,* 21–31.

The author presents the distribution and expectation bounds on order statistics from maximally (minimally) stable random variables of order j. In particular, the case of j-independent-F random variables (i.e., when each j-tuple of random variables is independent with a common marginal distribution F) is treated in detail.

Wieslaw Dziubdziela

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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

MR1822386 (2002b:62064) 62G30 60E15
Papadatos, Nickos (CY-CYP-MS)
Expectation bounds on linear estimators from dependent samples. (English summary)
J. Statist. Plann. Inference **93** (2001), *no. 1-2,* 17–27.

Summary: “Let $X_1, X_2, \ldots, X_n$ be a sample of arbitrary, possibly dependent, random variables, with possibly different marginal distributions, and denote by $X_{1:n} \leq X_{2:n} \leq \cdots \leq X_{n:n}$ the corresponding order statistics. Using the notation $\mu_i = \mathbb{E}X_i$ and $\sigma_i^2 = \operatorname{Var} X_i$, $i = 1, 2, \ldots, n$ (assumed finite), it is proved that, for any real constants

$\lambda_1, \lambda_2, \ldots, \lambda_n$,

$$\sum_{i=1}^{n} \lambda_i (\mathbb{E}X_{i:n} - \overline{\mu}) \leq \left(\sum_{i=1}^{n} (c_i - \overline{\lambda})^2 \right)^{1/2} \left(\sum_{i=1}^{n} \{(\mu_i - \overline{\mu})^2 + \sigma_i^2\} - n \mathrm{Var}\, \overline{X} \right)^{1/2},$$

where $\overline{\mu} = n^{-1} \sum_{i=1}^{n} \mu_i$, $\overline{\lambda} = n^{-1} \sum_{i=1}^{n} \lambda_i$, $\overline{X} = n^{-1} \sum_{i=1}^{n} X_i$ and $(c_1, c_2, \ldots, c_n)'$ is the l^2-projection of the vector $(\lambda_1, \lambda_2, \ldots, \lambda_n)'$ onto the convex cone of componentwise nondecreasing vectors in $\mathbb{R}^n$ (in particular, $c_i = \lambda_i$ for all i if and only if λ_i is nondecreasing in i). A similar lower bound is also given. The bound is sharp when the X's are exchangeable; moreover, it provides an improvement over the known bounds given by B. C. Arnold and R. A. Groeneveld [Ann. Statist. **7** (1979), no. 1, 220–223; MR0515696; correction; MR0594659], T. Aven [J. Appl. Probab. **22** (1985), no. 3, 723–728; MR0799296] and C. Lefèvre [Stochastic Anal. Appl. **4** (1986), no. 3, 351–356; MR0857087]."

Citations	From References: 1	From Reviews: 0

MR1714873 (2000h:60026) 60E15 62E10 62G30
Papadatos, Nickos (CY-CYP-MS)
Upper bound for the covariance of extreme order statistics from a sample of size three. (English summary)
Sankhyā Ser. A **61** (1999), *no. 2,* 229–240.

Let $X_{1:3}$ and $X_{3:3}$ be the minimum and the maximum of a sample of size 3 from a distribution F with finite variance σ^2. It is shown that $\mathrm{cov}(X_{1:3}, X_{3:3}) \leq 6\sigma^2/a^2 = 0.16838\sigma^2$, where a is the unique positive number satisfying $e^a = (6+a)/(6-a)$. Equality occurs if F is a hyperbolic sine distribution. *Barry C. Arnold*

Citations	From References: 1	From Reviews: 0

MR1659219 (2000b:62103) 62H05 60E15
Papadatos, N. [**Papadatos, Nickos**] (CY-CYP);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH)
Variational inequalities for arbitrary multivariate distributions. (English summary)
J. Multivariate Anal. **67** (1998), *no. 2,* 154–168.

Summary: "Upper bounds for the total variation distance between two arbitrary multivariate distributions are obtained in terms of the corresponding w-functions. The results

extend some previous inequalities satisfied by the normal distribution. Some examples are also given."

Satish Iyengar

MR1652364 (2000b:60053) 60F05 60F15
Cacoullos, T. [**Cacoullos, Theophilos**] (GR-UATH);
Papadatos, N. [**Papadatos, Nickos**] (CY-CYP-MS);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH)

★**Three elementary proofs of the central limit theorem with applications to random sums. (English summary)**

Stochastic processes and related topics, 15–23, *Trends Math.*, *Birkhäuser Boston*, *Boston*, *MA*, 1998.

For a real-valued continuous random variable X with mean μ, variance σ^2 and density f with interval support, define on the interval support a so-called w-function by the relation $\sigma^2 w(z)f(z) = \int_z^\infty (t-\mu)f(t)dt$. The w-function satisfies the basic covariance identity $\mathrm{Cov}[X, g(X)] = \sigma^2 E[w(X)g'(X)]$, valid for all absolutely continuous functions g with $E|w(X)g'(X)| < \infty$. Basic properties of the w-functions were derived in earlier papers by T. Cacoullos, V. Papathanasiou and the reviewer [Teor. Veroyatnost. i Primenen. **37** (1992), no. 4, 648–657; MR1210051; Ann. Probab. **22** (1994), no. 3, 1607–1618; MR1303658] and in an earlier paper by the authors of the present paper [Teor. Veroyatnost. i Primenen. **42** (1997), no. 1, 195–201; MR1453340]. Using these properties and the basic covariance identity, the authors review and simplify proofs of the central limit theorem presented in the above-mentioned papers by Cacoullos, Papathanasiou and the reviewer.

{For the collection containing this paper see MR1652360}

Sergei Utev

MR1643272 (99j:62009) 62E10
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH)

Total variation distance and generalized covariance kernels. (English summary)

Math. Methods Statist. **7** (1998), *no. 2,* 230–244.

The total variation distance between two continuous distributions is estimated in terms of special functionals depending on densities. These functionals are closely related to the Stein equation for the normal law and have the form

$$f^{-1}(x)\int_a^x (Eh(X) - h(t))f(t)dt.$$

Here $f(t)$ is the density of a random variable X. The authors generalize earlier results in this field [T. Cacoullos, V. Papathanasiou and S. Utev, Ann. Probab. **22** (1994), no. 3, 1607–1618; MR1303658], replacing the normal limiting law by the general continuous distribution. Examples include limiting Gumbel and Erlang laws. *Vydas Čekanavičius*

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Mathematical Reviews

Citations	From References: 2	From Reviews: 0

MR1621782 (99a:62075) 62G30
Papadatos, Nickos (GR-UATH-OR)
Exact bounds for the expectations of order statistics from non-negative populations. (English summary)
Ann. Inst. Statist. Math. **49** (1997), *no. 4,* 727–736.

Summary: "Some new exact bounds for the expected values of order statistics, under the assumption that the parent population is non-negative, are obtained in terms of the population mean. Similar bounds for the differences of any two order statistics are also given. It is shown that the existing bounds for the general case can be improved considerably under the above assumption."

AMERICAN MATHEMATICAL SOCIETY
MathSciNet
Mathematical Reviews

Citations	From References: 4	From Reviews: 1

MR1453340 (98g:60037) 60F05 62E10
Cacoullos, T. **[Cacoullos, Theophilos]** (GR-UATH);
Papadatos, N. **[Papadatos, Nickos]** (GR-UATH);
Papathanasiou, V. **[Papathanasiou, Vasilis]** (GR-UATH)
Variance inequalities for covariance kernels and applications to central limit theorems. (English. Russian summary)
Teor. Veroyatnost. i Primenen. **42** (1997), *no. 1,* 195–201; *translation in Theory Probab. Appl.* **42** (1997), *no. 1,* 149–155 (1998).

Consider the family $\mathbf{C}$ of random variables X satisfying the following conditions: (i) $E[X]=0,\ E[X^2]=1$, (ii) X is absolutely continuous with density f and its support is an interval (not necessarily finite), (iii) $E[w^2(X)]<\infty$, where the covariance kernel $w(\cdot)$ is defined for any x in the interval support of X by the relation $w(x)f(x)=\int_x^\infty tf(t)dt$. Let Φ be the standard normal distribution function, $\rho(F,\Phi)=\sup\{|F(A)-\Phi(A)|, A$ Borel$\}$ be the total variation distance between F and Φ, and F_n be the distribution of $(X_1+\cdots+X_n)/\sqrt{n}$, where the X_i are independent random variables with distribution F. Using the bound $\rho(F,\Phi)\le 2\sqrt{E[w^2(X)]}$ obtained by Cacoullos, Papathanasiou and S. A. Utev [Ann. Probab. **22** (1994), no. 3, 1607–1618; MR1303658], the authors prove that $\rho(F_n,\Phi)\le 2\sqrt{E[w_1^2(X_1)]}/\sqrt{n}$. They also give extensions of this result for non-identically distributed random variables, and random vectors. Finally, they use their methods to give a simple proof of the classical Darmois-Skitovich characterization theorem for normal distributions. *T. J. Sweeting*

Citations	From References: 7	From Reviews: 1

MR1450695 (98d:62090) 62G30
Papadatos, Nickos (GR-UATH-OR)
A note on maximum variance of order statistics from symmetric populations. (English summary)
Ann. Inst. Statist. Math. **49** (1997), *no. 1,* 117–121.

Summary: "The maximum variance of order statistics from a symmetric parent population is obtained in terms of the population variance. The proof is based on a suitable representation for the variance of order statistics in terms of the parent distribution function."

Citations	From References: 1	From Reviews: 0

MR1394673 (97a:60026) 60E15
Papadatos, N. **[Papadatos, Nickos]** (GR-UATH);
Papathanasiou, V. **[Papathanasiou, Vasilis]** (GR-UATH)
A generalization of variance bounds. (English summary)
Statist. Probab. Lett. **28** (1996), *no. 2,* 191–194.

Summary: "Upper and lower bounds for the variance of a random variable are obtained in terms of the density-quantile function. Some applications of these bounds to order statistics are given."

Citations	From References: 3	From Reviews: 2

MR1402000 (97j:60029) 60E05 60B10 60F05
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH)
Distance in variation between two arbitrary distributions via the associated w-functions. (English. Russian summary)
Teor. Veroyatnost. i Primenen. **40** (1995), *no. 3,* 685–694; *translation in Theory Probab. Appl.* **40** (1995), *no. 3,* 567–575 (1996).

Suppose that X, Y are random variables with means 0, variances 1 and density functions f_X, f_Y with interval supports. Let $d_{\rm tv}(X,Y)=\sup_A|P(X\in A)-P(Y\in A)|$ be a total variation distance, where the supremum is taken over the class of Borel sets. The w-function associated with the random variable X is defined by $w_X(z)=(\int_z^\infty tf_X(t)dt)/f_X(z)$. The typical upper bound obtained is $d_{\rm tv}(X,Y)\le c_YE\,|1-w_X(X)/w_Y(X)|$, where the constant c_Y depends only on Y. Let η have a standard normal distribution. Then $w_\eta(x)\equiv 1$, $c_\eta=2$, and the very general upper bound includes as a partial case the upper bound $d_{\rm tv}(X,\eta)\le 2E|1-w_X(X)|$ established by T. Cacoullos, V. Papathanasiou and S. A. Utev [Ann. Probab. **22** (1994), no. 3, 1607–1618; MR1303658]. *Sergei Utev*

MR1341216 (96g:62099) 62G30
Papadatos, Nickos (GR-UATH-OR)
Maximum variance of order statistics. (English summary)
Ann. Inst. Statist. Math. **47** (1995), *no. 1,* 185–193.

Summary: "H. J. Yang [Bull. Inst. Math. Acad. Sinica **10** (1982), no. 2, 197–204; MR0670317] proved that the variance of the sample median cannot exceed the population variance. In this paper, the upper bound for the variance of order statistics is derived, and it is shown that this is attained by Bernoulli variates only. The proof is based on Hoeffding's identity for the covariance."

MR1335157 (96h:62004) 62B10 60F05
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH);
Papathanasiou, V. [**Papathanasiou, Vasilis**] (GR-UATH)
Distance in variation and a Fisher-type information. (English summary)
Math. Methods Statist. **4** (1995), *no. 2,* 230–237.

T. Cacoullos, V. Papathanasiou and S. A. Utev [Ann. Probab. **22** (1994), no. 3, 1607–1618; MR1303658] established upper bounds for the distance in variation between an arbitrary probability measure and the standard normal distribution via some integro-differential functionals including information. Another proof of the central limit theorem was also obtained. In a paper by V. Papathanasiou and S. Utev ["Integro-differential inequalities and the Poisson approximation", Siberian Adv. Math., to appear], for the discrete case, these results were extended to approximate an arbitrary discrete probability measure by a Poisson distribution.

"In the present paper, by using a Fisher-type information measure, the authors extend the above results to obtain upper bounds for the distance in total variation between two arbitrary probability measures, in both the discrete and the continuous case. Applications of the results to the central limit theorem and to extreme-value theory are presented." *J. A. Melamed*

MR1323144 (95k:62141) 62G30 62G05
Papadatos, N. [**Papadatos, Nickos**] (GR-UATH)
Intermediate order statistics with applications to nonparametric estimation. (English summary)
Statist. Probab. Lett. **22** (1995), *no. 3,* 231–238.

Summary: "A generalization of order statistics is presented. Using this generalization, nonparametric confidence intervals are constructed for the quantiles of an absolutely continuous distribution. Finally, an application, concerning confidence intervals for the unique median, is given."