

## SELECTED ABSTRACTS

1. **N. R. Pascu**, M. N. Pascu, *An univalence criterion for analytic functions defined in type  $\varphi$  convex domains*, [Complex Analysis and Operator Theory](#) , (2017) DOI 10.1007/s11785-017-0692-2 pp. 1-7 IF 0.663

**Abstract:** In the present paper we introduce a new characterization of the convexity of a planar domain, based on the convexity constant  $K(D)$  of a domain  $D \subset \mathbb{C}$ . We show that in the class of simply connected planar domains,  $K(D)=1$  characterizes the convexity of the domain  $D$ . Using the convexity constant of a domain, we derive a sufficient condition for the univalence of an analytic function defined in a type  $\varphi$  convex domain, similar to the one obtained by M. O. Reade (Math Soc Jpn 10:255–259, 1958), but involving the modulus instead of the argument of the derivative of the function. As a corollary we obtain the well-known Ozaki–Nunokawa–Krzysz univalence criterion, and we also show that our condition is sharp.

2. **N. R. Pascu**, M. N. Pascu, *Convexity constant of a domain and applications*, [Journal of Mathematical Analysis and Applications](#) JMAA-16-2601, **449**, No. 1, (2017), Pp. 793–807. IF 1.135

**Abstract:**In the present paper we introduce a new characterization of the convexity of a planar domain, based on the convexity constant of a domain. We show that in the class of simply connected planar domains, characterizes the convexity of the domain  $D$ , and we derive the value of the convexity constant for some classes of doubly connected domains of the form, for certain choices of the domains  $D$  and  $\Omega$ . Using the convexity constant of a domain, we derive an extension of the well-known Ozaki–Nunokawa–Krzysz univalence criterion for the case of non-convex domains, and we present some examples, which show that our condition is sharp.

3. R. Kargar, **N. R. Pascu**, A. Ebadian, *Locally univalent approximations of analytic functions* [Journal of Mathematical Analysis and Applications](#) (2017), , <https://doi.org/10.1016/j.jmaa.2017.04.054>). IF 1.135

**Abstract:** In the present paper, we introduce a measure of the non-univalence of an analytic function, and we use it in order to find the best approximation of analytic function by a locally univalent normalized analytic function.

4. L. Beznea, M. N. Pascu, **N. R. Pascu**, *Connections between the Dirichlet and the Neumann problem for continuous and integrable boundary data*, Proceedings Conference Rodrigo Banuelos (accepted, to appear in [Progress in Probability](#) Springer International Publishing AG (2017), Birkhauser).

**Abstract:** We present results concerning the representation of the solution of the Neumann problem for the Laplace operator on the  $n$ -dimensional unit ball in terms of the solution of an associated Dirichlet problem. We show that the representation holds in the case of integrable boundary data, thus providing an explicit solution of the generalized solution of the Neumann problem.

5. L. Beznea, M. N. Pascu, **N. R. Pascu**, *An Equivalence Between the Dirichlet and the Neumann Problem for the Laplace Operator*, [Potential Anal.](#) 44 (2016), No. 4, pp. 655 – 672. IF 0.956

**Abstract:** We give a representation of the solution of the Neumann problem for the Laplace operator on the  $n$ -dimensional unit ball in terms of the solution of an associated Dirichlet problem. The representation is extended to other operators besides the Laplacian, to smooth simply connected planar domains, and to the infinite-dimensional Laplacian on the unit ball of an abstract Wiener space, providing in particular an explicit solution for the Neumann problem in this case. As an application, we derive an explicit formula for the Dirichlet-to-Neumann operator, which may be of independent interest.

6. M. N. Pascu, **N. R. Pascu**, N. Stoian, *Brownian Probabilities under symmetric rearrangement*, [Bull. Transilvania Univ. of Brasov Ser. III](#), 8(57) (2015), No. 2, pp. 89 – 92.

**Abstract:** We show that the probability that a Brownian motion lies in a given set at an arbitrarily fixed time is increased under the symmetric rearrangement of the set.

7. M. N. Pascu, **N. R. Pascu**, *Convex approximations of analytic functions*, [Appl. Math. Comput.](#) 232 (2014), pp. 559 – 567. [MR3181294](#) IF 1.702

**Abstract:** We introduce a method for constructing the best approximation of an analytic function in a subclass of convex functions, in the sense of the norm. The construction is based on solving a certain semi-infinite quadratic programming problem, which may be of independent interest.

8. M. N. Pascu, **N. R. Pascu**, O. Rachieru, *An asymptotic formula for the semimartingale local time of reflecting Brownian motion on an interval*, [Bull. Transilvania Univ. of Brasov Ser. III](#), 7(56) (2014), No. 1, pp. 47 – 56. [MR3234143](#)

**Abstract:** We derive an asymptotic formula for the expected value of the difference of the semimartingale local times of the 1-dimensional reflecting Brownian motion on  $[-1,1]$  at the two ends of the interval. As an application we derive the classical probabilistic representation of the solution of the Neumann problem for the Laplace operator in the 1-dimensional case.

9. M. N. Pascu, **N. R. Pascu**, M. I. Pop, *A simple proof of the Gaussian lower bound for the Neumann heat kernel of convex domains*, [Bull. Transilvania Univ. of Brasov Ser. III](#), 6(55) (2013), No. 2, pp. 17 – 22. [MR3161080](#)

**Abstract:** We present a simple proof of the gaussian lower bound for the Neumann heat kernel of convex domains. The proof is probabilistic in spirit and relies on a geometric property of the extended mirror coupling of reflecting Brownian motions introduced in [7].

10. M. N. Pascu, **N. R. Pascu**, *A Strong Law of Large number for a probabilistic cash flow model*, [Bull. Transilvania Univ. of Brasov Ser. III](#), 5(54) (2012), No. 2, pp. 49 – 56. [MR3035855](#)

**Abstract:** In a previous paper, the first author introduced a probabilistic model for the cash flow in a (homogeneous) population. In the present paper we extend the model by considering the case of a non-homogeneous population, and we derive the properties of the model. We show that the random walk corresponding to the trajectory of acoin within the population is a recurrent and irreducible martingale, and we derive a corresponding Strong Law of Large numbers for it.

11. M. N. Pascu, **N. R. Pascu**, *Starlike approximations of analytic functions*, [Appl. Math. Comput.](#) **218** (2012), No. 12, pp. 6825 – 6832. [MR2880338](#) IF 1.702

**Abstract:** When an analytic function is not univalent, it is often of interest to approximate it by univalent functions. In this paper we introduce a measure of the non-univalence of a function and we derive a method for constructing the best starlike univalent approximations of analytic functions with respect to it, suitable for both practical problems and numerical implementation.

12. M. N. Pascu, **N. R. Pascu**, *A note on the sticky Brownian motion on  $\mathbb{R}$* , [Bull. Transilv. Univ. Brasov Ser. III](#), 4(53) (2011), No. 2, pp. 57 – 62. [MR2926619](#)

**Abstract:** We consider a degenerate stochastic differential equation which describes an arbitrary sticky Brownian motion on  $\mathbb{R}$  with sticky point 0. We obtain a representation formula different from the classical one, which describes the solutions in terms of time delays.

13. M. N. Pascu, **N. R. Pascu**, *Neighborhoods of univalent functions*, [Bull. Aust. Math. Soc.](#) **83** (2011), No. 2, pp. 210 – 219.

**Abstract:** The main result shows that a small perturbation of a univalent function is again a univalent function, hence a univalent function has a neighbourhood consisting entirely of univalent functions. For the particular choice

of a linear function in the hypothesis of the main theorem, we obtain a corollary which is equivalent to the classical Noshiro–Warschawski–Wolff univalence criterion. We also present an application of the main result in terms of Taylor series, and we show that the hypothesis of our main result is sharp.

14. M. N. Pascu, **N. R. Pascu**, *A closer look at the solution of a degenerate stochastic differential equation*. [Bull. Transilv. Univ. Brasov Ser. III](#) **4 (53)** (2011), No. 1, pp. 59 – 66.

**Abstract.** In an attempt to better understand the existence and uniqueness of strong solutions of stochastic differential equations, we study a classical example of a degenerate stochastic differential equation, attributed to H. Tanaka, for which the existence and uniqueness of strong solutions fails, but for which we can explicitly describe the set of all (weak) solutions.

15. **N. R. Pascu**, *On a Theorem of Picard and Applications*, [Bull. Transilv. Univ. Brasov Ser. III](#) **3 (52)** (2010), pp. 77–80.

**Abstract:** We give a simple proof of a theorem of Picard and as an application we obtain a generalization of Leibniz’s criterion for convergence of series.

16. **N. R. Pascu**, M. N. Pascu, *Injectivity criteria for  $C^1$  functions defined in non-convex domains*, [Studia Univ. Babeş-Bolyai LV](#) (2010), No. 3, pp. 179 – 186. [MR2764262](#)

**Abstract:** In the present paper we obtain sufficient conditions for the injectivity of functions of class  $C^1$  defined in type  $\varphi$  convex domains. In particular, we obtain some injectivity criteria for functions of class  $C^1$  defined in some simply and doubly connected domains, and we derive as a corollary the well-known Ozaki-Nunokawa-Krzyz univalence criterion.

17. **N. R. Pascu**, M. N. Pascu, *Some extensions of Schwarz lemma for analytic functions defined in angular regions*, Proc. of the Sixth Congress of Romanian Mathematicians, [Romanian Academy Publishing House](#), 2009, pp. 189 – 196. ISBN 978-973-27-1780-6) [Zbl 1166.00017](#) [MR2641565](#)

**Abstract:** Using an extension of the Julia–Wolf–Carathéodory lemma for the case of analytic functions defined in a strip, the authors obtained a Schwarz lemma for analytic functions defined in a half-disk.

In this paper we present some improvements of these results, as well as some extensions to the case of analytic functions defined in angular domains, and we show that the inequalities involved are sharp. As corollaries, we obtain the proof of the classical Schwarz lemma (with an additional hypothesis) and certain inequalities for analytic functions defined in the half-disk.

18. M. N. Pascu, **N. R. Pascu**, *Domain convergence of reflecting Brownian motion*, Proc. of the Sixth Congress of Romanian Mathematicians, [Romanian Academy Publishing House](#), 2009, pp. 185 – 189. ISBN 978-973-27-1780—6. [Zbl 1166.00017](#) [MR2641564](#)

**Abstract:** We show that for smooth planar domains  $D_n$ , if  $D_n$  converges to the domain  $D$  with respect to the point  $w \in D$  (in the sense of Carathéodory kernel convergence), then the transition density of reflecting Brownian motion in  $D_n$  starting at  $w \in D$  converges to the transition density of reflecting Brownian motion in  $D$  starting at  $w \in D$ .

19. M. N. Pascu, **N. R. Pascu**, *Brownian Motion on the Circle and Applications*, [Bull. Transilv. Univ. Brasov Ser. III](#) **15 (50)** (2008), pp. 469 – 478. [MR2478047](#)

**Abstract:** We give an explicit representation of the 1-dimensional reflecting Brownian motion on an interval in terms of a free 1-dimensional Brownian motion on the circle. As an application, we derive a probabilistic proof of the Laugesen-Morpurgo conjecture in the 1-dimensional case.

20. M. E. Gageonea, S. Owa, **N. R. Pascu**, M. N. Pascu, *A maximum modulus principle for non-analytic functions defined in the unit disk*, [Appl. Math. Comput.](#) **187** (2007), No. 1, pp. 163 – 169. [MR2323565](#) IF 1.702

**Abstract:** Maximum principles for analytic functions are very important tools in the analytic function theory. In the present paper, we consider a maximum principle for a class of non-analytic function defined on the open unit disk. Some examples for our theorems are also shown.

21. M. N. Pascu, **N. R. Pascu**, *Monotonicity properties of reflecting Brownian motion*, 21<sup>st</sup> Scientific Session on Mathematics and its Applications, Transilvania University Press, 2007, pp. 109 -- 112.

**Abstract:** We give the proof of an integral version of Chavel's conjecture on domain monotonicity of transition densities of reflecting Brownian motion for certain classes of planar domains.

22. M. E. Gageonea, **N. R. Pascu**, M. N. Pascu, *A maximum modulus principle for a class of non-analytic functions defined in the unit disk*, *Mathematica* **49(72)** (2007), No. 2, pp. 169 – 174. [MR2431144](#) [Zbl05530442](#)

**Abstract:** We obtain a maximum modulus principle for a large class of non-analytic functions defined in the unit disk. A corollary and an application in the case of real valued functions of two variables are also given.

23. M. N. Pascu, M. Gageonea, **N. R. Pascu**, *On Schwarz Lemma*, 20<sup>th</sup> Scientific Session on Mathematics and its Applications, Transilvania University Press, 2006, pp.103 – 108. ISBN 973–635–854–2

**Abstract:** We obtain an extension of the classical Schwarz lemma, similar to the Julia-Wolff-Caratheodory lemma, for analytic functions defined in the half-strip.

24. M. N. Pascu, **N. R. Pascu**, *Some extensions of the Schwarz Lemma*, Proceedings of the International Symposium on Complex Function Theory and Applications, Brasov, 1–5 September 2006, Transilvania University Press, 2006, pp. 93 – 102. ISBN 973–635–827–5

**Abstract:** In the present paper we obtain a version of the Schwarz lemma for the semi-infinite strip, similar to the Julia – Wolf – Carathéodory lemma, and also a Schwarz lemma for the half-disk. As corollaries, we derive the classical Schwarz lemma for analytic functions defined in the unit disk (satisfying an additional hypothesis), and we present some examples.

25. M. N. Pascu, **N. R. Pascu**, *Domain convergence of reflecting Brownian motion*, Proceedings of the International Symposium on Geometric Function Theory and Applications, TC Istanbul Kultur University, August 20 – 24 , 2007, pp. 71–77, ISBN: 978-6957-42-9.

**Abstract:** For smooth bounded domains  $D, D_n \subset \mathbb{C}$  ( $n \geq 1$ ) we show that if  $D_n$  converges to  $D$  with respect to the point  $x \in D$  in the sense of Carathéodory kernel convergence, then the transition densities  $p_{D_n}(t, x, y)$  of the reflecting Brownian motion in  $D_n$  starting from  $x$  converge to the transition density  $p_D(t, x, y)$  of the reflecting Brownian motion in  $D$  starting from  $x$ . In the particular case of an increasing sequence  $D_n$  of domains, we obtain a previous result of K. Burdzy and Z. Q. Chen.