

**Zhao, Yingxue; Meng, Xiaoge; Qiao, Han; Wang, Shouyang; Coladas Uria, Luis**

**Characterizations of semi-prequasi-invexity.** (English) [Zbl 1398.26012](#)

*J. Syst. Sci. Complex.* 27, No. 5, 1008-1026 (2014).

Summary: Because of its importance in optimization theory, the concept of convexity has been generalized in various ways. With these generalizations, to seek some practical criteria for them is especially important. In this paper, some criteria are developed for semi-prequasi-invexity, which includes prequasi-invexity as the special case. Mutual characterizations among semi-prequasi-invex functions, strictly semi-prequasi-invex functions, and strongly semi-prequasi-invex functions are presented.

**MSC:**

**26B25** Convexity of real functions of several variables, generalizations

**90C25** Convex programming

**Keywords:**

convex programming; dense; semi-prequasi-invex function; strictly semi-prequasi-invex function; strongly semi-prequasi-invex function

**Full Text:** [DOI](#)

**References:**

- [1] Martin, D H, The essence of invexity, *Journal of Optimization Theory and Applications*, 47, 65-76, (1985) · [Zbl 0552.90077](#) · [doi:10.1007/BF00941316](#)
- [2] Ben-Israel, A; Mond, B, What is invexity?, *The Journal of the Australian Mathematical Society, Series B*, 28, 1-9, (1986) · [Zbl 0603.90119](#) · [doi:10.1017/S0334270000005142](#)
- [3] Noor, M A; Noor, K I, Some characterizations of strongly preinvex functions, *Journal of Mathematical Analysis and Applications*, 316, 697-706, (2006) · [Zbl 1093.26006](#) · [doi:10.1016/j.jmaa.2005.05.014](#)
- [4] Fan, L; Guo, Y, On strongly  $\rho$ -preinvex functions, *Journal of Mathematical Analysis and Applications*, 330, 1412-1425, (2007) · [Zbl 1121.26010](#) · [doi:10.1016/j.jmaa.2006.08.067](#)
- [5] Yang, X M; Li, D, On properties of preinvex functions, *Journal of Mathematical Analysis and Applications*, 256, 229-241, (2001) · [Zbl 1016.90056](#) · [doi:10.1006/jmaa.2000.7310](#)
- [6] Yang, X M; Yang, X Q; Teo, K L, Characterizations and applications of prequasi-invex functions, *Journal of Optimization Theory and Applications*, 110, 645-668, (2001) · [Zbl 1064.90038](#) · [doi:10.1023/A:1017544513305](#)
- [7] Luo, H Z; Xu, Z K, On characterizations of prequasi-invex functions, *Journal of Optimization Theory and Applications*, 120, 429-439, (2004) · [Zbl 1100.90035](#) · [doi:10.1023/B:JOTA.0000015930.47489.b7](#)
- [8] Antczak, T,  $(\rho, r)$ -invex sets and functions, *Journal of Mathematical Analysis and Applications*, 263, 355-379, (2001) · [Zbl 1051.90018](#) · [doi:10.1006/jmaa.2001.7574](#)
- [9] Anderson, G D; Vamanamurthy, M K; Vuorinen, M, Generalized convexity and inequalities, *Journal of Mathematical Analysis and Applications*, 335, 1294-1308, (2007) · [Zbl 1125.26017](#) · [doi:10.1016/j.jmaa.2007.02.016](#)
- [10] Chen, X, Some properties of semi-E-convex functions, *Journal of Mathematical Analysis and Applications*, 275, 251-262, (2002) · [Zbl 1072.90561](#) · [doi:10.1016/S0022-247X\(02\)00325-6](#)
- [11] Mukherjee, R N; Keddy, L V, Semicontinuity and quasiconvex functions, *Journal of Optimization Theory and Applications*, 94, 715-720, (1997) · [Zbl 0892.90145](#) · [doi:10.1023/A:1022609218907](#)
- [12] Mohan, S R; Neogy, S K, On invex sets and preinvex functions, *Journal of Mathematical Analysis and Applications*, 189, 901-908, (1995) · [Zbl 0831.90097](#) · [doi:10.1006/jmaa.1995.1057](#)
- [13] Yang, X M; Li, D, Semistrictly preinvex functions, *Journal of Mathematical Analysis and Applications*, 258, 287-308, (2001) · [Zbl 0985.26007](#) · [doi:10.1006/jmaa.2000.7382](#)
- [14] Luo, H Z; Wu, H X, On the relationships between G-preinvex functions and semistrictly G-preinvex functions, *Journal of Computational and Applied Mathematics*, 222, 372-380, (2008) · [Zbl 1154.90010](#) · [doi:10.1016/j.cam.2007.11.006](#)
- [15] Craven, B D; Eberhard, A (ed.); Hafjussavvas, N (ed.); Luc, D T (ed.), *Characterizing invex and related properties*, 183-191, (2005), New York · [Zbl 1076.26010](#) · [doi:10.1007/0-387-23639-2\\_11](#)
- [16] Ruiz-Garzón, G; Osuna-Gómez, R; Rufián-Lizana, A, Generalized invex monotonicity, *European Journal of Operational Research*, 144, 501-512, (2003) · [Zbl 1028.90036](#) · [doi:10.1016/S0377-2217\(01\)00393-9](#)
- [17] Zhao, Y X; Wang, S Y; Coladas Uria, L, Characterizations of  $\rho$ -convex functions, *Journal of Optimization Theory and Applications*, 145, 186-195, (2010) · [Zbl 1231.90314](#) · [doi:10.1007/s10957-009-9617-1](#)

- [18] Yang, X M, Semi-preinvexity and multi-objective programming problems, Journal of Chongqing Normal University (Edition of Natural Science), 11, 1-5, (1994) · [Zbl 0828.76049](#)
- [19] Yang, X M; Liu, S Y, Note three kinds of generalized convexity, Journal of Optimization Theory and Applications, 86, 501-513, (1995) · [Zbl 0838.90117](#) · [doi:10.1007/BF02192092](#)
- [20] Yang, X M; Yang, X Q; Teo, K L, Criteria for generalized invex monotonicities, European Journal of Operational Research, 164, 115-119, (2005) · [Zbl 1132.90360](#) · [doi:10.1016/j.ejor.2003.11.017](#)
- [21] Avriel M, `\textit{Nonlinear Programming: Analysis and Methods}`, Prentice-Hall, Englewood Cliffs, 1976 (in Chinese). · [Zbl 0361.90035](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.