

**Zeitschrift:** L'Enseignement Mathématique  
**Herausgeber:** Commission Internationale de l'Enseignement Mathématique  
**Band:** 31 (1985)  
**Heft:** 1-2: L'ENSEIGNEMENT MATHÉMATIQUE

**Artikel:** NOTE ON LEVI'S PROBLEM WITH DISCONTINUOUS FUNCTIONS  
**Autor:** Coltoiu, Mihnea  
**Kapitel:** §1. Introduction  
**DOI:** <https://doi.org/10.5169/seals-54571>

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## A NOTE ON LEVI'S PROBLEM WITH DISCONTINUOUS FUNCTIONS

by Mihnea COLTOIU

### § 1. INTRODUCTION

In [3] Fornaess and Narasimhan proved that a complex space  $X$  which carries a strongly plurisubharmonic exhaustion function  $\varphi: X \rightarrow \mathbf{R}$  is a Stein space. It is a remarkable fact that  $\varphi$  is supposed only upper semicontinuous.

A natural question which arises when we consider the Levi problem with upper semicontinuous functions is the following: what would happen if we allowed  $\varphi$  to take on the value  $-\infty$ . Simple examples (compact complex spaces, the blowing up of  $\mathbf{C}^n$  at the origine...) show us that  $X$  is not necessarily Stein. The best result one might hope to obtain is  $X$  being 1-convex.

The aim of this short note is to give an affirmative answer to this question, hence to prove the following theorem conjectured by Fornaess and Narasimhan:

**THEOREM 1.** *Let  $X$  be a complex space which admits a strongly plurisubharmonic exhaustion function  $\varphi: X \rightarrow [-\infty, \infty)$ . Then  $X$  is 1-convex.*

If  $\varphi$  is supposed real-valued it follows easily, from the maximum principle, that the exceptional set of  $X$  is empty, hence  $X$  is Stein. This is exactly Fornaess-Narasimhan's theorem.

### § 2. PRELIMINARIES

All complex spaces are assumed to be reduced and countable at infinity.

An upper semicontinuous function  $\varphi: X \rightarrow [-\infty, \infty)$  is called plurisubharmonic if for every holomorphic map  $\tau: W \rightarrow X$  ( $W =$  the unit disc in  $\mathbf{C}$ ) it follows that  $\varphi \circ \tau$  is subharmonic on  $W$  (possibly  $\equiv -\infty$ ).  $\varphi$  is said