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## A HOLOMORPHICALLY SEPARABLE COMPLEX SPACE WITHOUT THE GELFAND TOPOLOGY

by Sandra HAYES-WIDMANN

### ABSTRACT

An example of a holomorphically separable complex space with a Stein envelope of holomorphy which does not carry the Gelfand topology is given. This example also shows that an injective holomorphic map  $\varphi: X \rightarrow Y$  between complex spaces with  $\dim_x X = \dim_{\varphi(x)} Y$ ,  $x \in X$ , is not always open, even when  $\varphi$  is the canonical map of a pre-Stein space  $X$  into its envelope of holomorphy.

### INTRODUCTION

The Gelfand topology for a reduced complex space  $(X, \mathcal{O})$  is the weak topology on  $X$  determined by the global function algebra  $\mathcal{O}(X)$ . Since only holomorphically separable complex spaces can carry this topology, it is natural to ask whether holomorphic separability characterizes those complex spaces with the Gelfand topology. A remark in [4, Bemerkung 3] implies that this is the case, at least for pre-Stein spaces. However, a counter-example given here shows that holomorphically separable spaces need not have the Gelfand topology, even when they are pre-Stein.

### EXAMPLE

If a complex space  $(X, \mathcal{O})$  is furnished with the Gelfand topology, then it must be holomorphically separable in a strong sense—every interior point can be separated not only from every other interior point but also from every “boundary” point by a global holomorphic function. More precisely,