AN OPEN PROBLEM ON BOUNDARY BEHAVIOUR OF HOLOMORPHIC MAPPINGS

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In the study of the boundary behaviour of proper holomorphic mappings between weakly pseudoconvex domains with C^∞-boundaries the following property plays the fundamental role:

Property R. A domain D has the property R iff the Bergman projection $P: L^2(D) \longrightarrow L^2H(D)$ is a continuous operator from $C^\infty(\bar{D})$ into itself with the usual Fréchet topology.

A sufficient (but not necessary) condition for the property R is the following: *A smooth pseudoconvex domain has the property R if for each $s > 0$ there exists an operator solving the $\bar{\partial}$-problem, which is a compact operator T_s from the space $W^s_{\langle 0,1\rangle}$ of $\bar{\partial}$-closed $\langle 0,1\rangle$-forms with the s-th Sobolev norm into the Sobolev space $W^s(D)$.*

The PROBLEM posed is to characterize the domains D for which such compact operators exist. In particular, does there exist a domain D for which the subelliptic estimates for the $\bar{\partial}$-Neumann problem are *not* valid and for which there exist compact operators which solve the $\bar{\partial}$-problem?

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