

**THE $\bar{\partial}$ -NEUMANN OPERATOR AND
COMMUTATORS BETWEEN THE BERGMAN
PROJECTIONS AND MULTIPLICATION
OPERATORS.**

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ABSTRACT. We prove that compactness of the canonical solution operator to $\bar{\partial}$ restricted to $(0, 1)$ -forms with holomorphic coefficients implies compactness of the commutator $[\mathcal{P}, \bar{M}]$ defined on the whole $L^2_{(0,1)}(\Omega)$, where \bar{M} is the multiplication by \bar{z} and \mathcal{P} is the orthogonal projection of $L^2_{(0,1)}(\Omega)$ to the subspace of $(0, 1)$ -forms with holomorphic coefficients. Further we derive a formula for the $\bar{\partial}$ -Neumann operator restricted to $(0, 1)$ -forms with holomorphic coefficients expressed by commutators between the Bergman projections and the multiplication operators by z and \bar{z} .