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1003-32-648 **Andrew S Raich*** (raich@math.wisc.edu), Department of Mathematics, University of Wisconsin-Madison, 480 Lincoln Dr., Madison, WI 53706. *Heat equations and the $\bar{\partial}$-problem on weighted L^2 spaces in $\mathbb{C}$.* Preliminary report.

We study the $\bar{\partial}_b$-problem on polynomial model domains (PMD) in $\mathbb{C}^2$. A PMD $M = \{(z, w) : \Im(w) = p(z)\}$ where p is a subharmonic polynomial. $M \cong \mathbb{C} \times \mathbb{R}$, and $\bar{\partial}_b$ (on M) becomes $\bar{\partial}_b = \partial_{\bar{z}} - ip_{\bar{z}}\partial_\tau$. Taking the partial Fourier transform in τ, $\bar{\partial}_b$ is $\bar{Z}_t = \partial_{\bar{z}} + 2\pi tp_{\bar{z}}(z)$, a one-parameter family of operators indexed by t. If $2\pi tp(z) = \psi(z)$, $\bar{Z}_t = e^{-\psi}\partial_{\bar{z}}e^{\psi}$, the $\bar{\partial}$ operator on $L^2(\mathbb{C}, e^{-2\psi})$. Thus, $\bar{\partial}$ on weighted L^2 spaces connects with $\bar{\partial}_b$ on M. Christ obtains pointwise estimates on the fundamental solution R_t of $\bar{Z}_t u = f$, $t > 0$. He shows $\Box_t = \bar{Z}_t\bar{Z}_t^*$ is invertible on $L^2(\mathbb{C})$ and bounds R_t using $\Box_t^{-1}$. Unlike Christ, we study $\Box_t^{-1}$ using $\partial_s u + \Box_t u = 0$ (HE) where $t \in \mathbb{R}$. We solve (HE) by $e^{-s\Box_t}f(z) = \int H_t(s, z, w)f(w)\, dw$. $H_t(s, z, w)$ is C^∞ off $\{(s, z, w) : z = w,\ s = 0\}$ and we bound $H_t(s, z, w)$ and its derivatives. We estimate on G_t and R_t for all t and improve the $\Box_b = \bar{\partial}_b^*\bar{\partial}_b$-heat equation results on PMD of Nagel-Stein. (Received September 25, 2004)