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**Rod Freed\*** ([gauss12@hotmail.com](mailto:gauss12@hotmail.com)), 12939 Bonaparte #7, Marina Del Rey, CA 90066. *Green's Function and the Inverse of a Differential Operator.*

Let  $L^2_m([0, \infty))$  denote the space of  $L^2$  functions on  $[0, \infty)$  into  $C_m$ , and let  $F$  be the differential operator in  $L^2_m([0, \infty))$  associated with  $f'(t) = Df(t)$ , where  $f(0)$  is in  $B$ , a subspace of  $C_m$ . We prove that  $D$  has no eigenvalues on the imaginary axis and that  $C_m$  is a direct sum of  $\text{Ker}(R)$  and  $B$  (where  $R$  is the Riesz projection of  $D$  corresponding to the eigenvalues of  $D$  in the open left half plane) if and only if  $F$  is invertible. Also, we show that the inverse,  $G(h)$ , of  $F$  is the operator which is the integral of  $g(t,s)h(s)$  with respect to  $s$ , where  $g(t,s)$  is  $\exp(-tD)(I-P)\exp(sD)$  for  $s < t$  and is  $-\exp(-tD)P \exp(sD)$  for  $t < s$ , where  $P$  is the projection of  $C_m$  along  $\text{Ker}(R)$  onto  $B$ . (Received February 18, 2010)