1015-47-74 **Yoshimi Saito*** (saito@math.uab.edu), 1507 Wellington Rd, Birmingham, AL 35209. *Nonlinear eigenvalue problem for the Hardy operator.*

Let $Tf(x) = v(x)\int_a^x u(t)f(t)dt$ be the Hardy operator from $L^p(I)$ into $L^q(I)$, where $I = (a,b)$ is a fininte interval, $u \in L^{p'}(I)$, $v \in L^q(I)$, $1 < p, q < \infty$, $p^{-1} + p'^{-1} = 1$ and $u(x)v(x) \neq 0$ a.e. on I.

The stationary vectors f are defined and the "eigenvalue" associated with f is given by $\mu_f = ||Tf||_q/||f||_p$. The stationary vector f satisfie the equation

$T^*((Tf)^{(q-1)}) = \lambda^{-1} f^{(p-1)}$

where $g^{(t)} = |g|^{t-1}g$ (odd power function) and $\lambda = \lambda_f = ||Tf||_q^q/||f||_p^p$.

We shall descuss the property of these eigenvalues.

In the case $p = q$ we can show how to find all stationary vectors and it turned out that these eigenvalue are the same as the approximate numbers of T. The prüfer transform will be used as a useful tool.

In the general case, we can show the existence of the eigenvalues. But it seems that many other questions are still unanswered.

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