Each doc in this folder has a one paragraph **summary** at the start.

This is the *first* series of docs in which I try but fail to solve a certain 2D integral eigenvalue problem

$$\int\int_S dx'dy'\, u(x',y')\, 1/(\sqrt{(x-x')^2+(y-y')^2}) = \mu\, u(x,y) \qquad Ku = \mu u$$

where S is some flat surface like a disk. This is the problem suggested by Sneddon on his page 203.

I think there is "something fishy" going on with this problem, it is not well-posed in some sense. I don't know what the boundary conditions should be or not be, and I cannot find a corresponding differential EV equation which ought to involve the operator L_{xy} where

$$L_{xy}(1/\sqrt{(x-x')^2+(y-y')^2}) = 4\pi\delta(x-x')\delta(y-y')$$

and this is the subject of the "math problem" doc. Shankar thinks L_{xy} does not exist. Jim found two candidate L_{xy} operators for the case x'=y'=0, but not for the equation as stated above.

If I want to pursue it further, I would probably have to go look up Sned's p 203 references and perhaps ask other people like Carleton or Richard Price.

The problem is only of academic interest to me as a Stakgold test problem. It does not have the interest say of the charged bowl problem. Since I still have that bowl problem not fully resolved, and other pending problems and readings as well, I think I will cease and desist here probably forever. Maybe in my readings I will come across something related to this problem. [But I did not cease and desist...]

-PhL 1.5.11