Hi,

On the solution to the Thirring model, I had something simpler in mind. If you just go parallel to the treatment of the Schwinger model, the field equation becomes

$$\frac{A_\mu}{g} = \frac{1}{\pi}(A_\mu - k_\mu k_\nu A^\nu / k^2)$$

If you add a source term $iv_\mu$ for some four-vector $v$ (a delta function in position space becomes a constant in momentum space, but I forgot that you also need something with a $\mu$ index), you can solve this for the $A_\mu$ propagator. It has a pole at $k^2 = 0$, signifying that the vector is still massless, unlike the Schwinger model. The propagator blows up when $g = \pi$, and the theory is actually sick past this point.

Richard's approach should work, I think, but something goes wrong somewhere because this theory does not have a phase with massive particles. By the way, the determinant of $\not{D}$ is easy to calculate using the fact that its functional derivative with respect to $A_\mu$ is $i\langle j_\mu \rangle_A$ — I should have included this in the problem.

This problem could definitely have been better written - this is the downside of trying to make original problems. So please contact me if a problem is unclear, especially one that I have made up!

Joe