Re: Fourier Transform, Smooth Functions

Source: http://sci.tech−archive.net/Archive/sci.math/2006−02/msg04338.html

- *From*: "irchans" <infinitgames@xxxxxxxxx>
- *Date*: 27 Feb 2006 06:45:26 −0800

Thank you very much David P, David U, and Han.

I really like David P's idea that represented the fourier transform as an infinite product. I am still working my way through the proofs by David U.

Let me tell you about my attempts to grapple with this problem. I had an idea for a proof that has not been written out to show that p cannot be greater than 1. (David U's proof is shorter.) Maybe later I can post this proof. I also looked at the function

f(x) = Exp(−1/(x−1)/(1−x)) when abs(x) <=1 and f(x) = 0 otherwise.

This function is infinitely differentiable and compactly supported. I numerically caculated the log(abs(g(s))) for s = 1, ... 40 and got

−3.15, −8.143, −5.982, −6.567, −7.465, −8.697, −12.108, −10.05, \
−9.968, −10.223, −10.637, −11.173, −11.848, −12.761, −14.579, \
−14.156, −13.671, −13.634, −13.766, −13.997, −14.302, −14.675, \
−15.121, −15.666, −16.377, −17.533, −18.628, −17.468, −17.204, −17.162,
\
−17.229, −17.367, −17.557, −17.793, −18.072, −18.396, −18.773, −19.222,
\
−19.784, −20.584

These values were approximately equal to −3.22*sqrt(s), so g(s) seems to be order exp(−abs(1/s^p)) for any p < 1/2.

Of course, these are just calculations and they are not a proof.

.