

1. Spent most of the lecture starting and proving the existence of a Green's kernel solution for an arbitrary linear diff. operator and then explaining how to deduce the statement of the theorem (but not the proof) by using the Dirac delta function. This reverses the usual/ logical order: Actually, one first manipulates the Dirac delta function to deduce a statement, and only after this one finds a rigorous proof. But I think this order works better pedagogically: Having first seen a rigorous proof, the students were more willing to accept non-rigorous manipulations of δ that lead quickly to the theorem at the beginning of the lecture.

Complete notes of what was discussed in lecture + missing details and more examples are in the handout (which I gave out on Friday). The only example we did was (B) from §3 of the handout--- relating the theorem to variation of parameters.

2. Introduced the Laplace transform.
Motivated & derived the Laplace transform from the requirement that $L[f']$ is close to $s.L[f]$ as for the Fourier transform $\left(s = \frac{in\pi}{L}\right)$. Deduce the formula

$$L[f'] = sL[f] - f(0)$$

$$L[f^{(n)}] = s^n L[f] - (f^{(n-1)}(0) + sf^{(n-2)}(0) + \dots + s^{n-1}f(0)).$$