Topics in Mathematical Physics (PHYS 320):14 Spring 2009

Reading: Series Solutions Chapter 12 Section 1

(1) Show that the Laplace transform of the square wave

$$f(t) = \begin{cases} \text{A} & \text{when } 0 < t < a \\ \text{-A} & \text{when } a < t < 2a \end{cases}$$

and so on down the real line, is

$$\frac{A}{s} \tanh\left(\frac{as}{2}\right)$$

(2) Sketch the periodic extension of

$$f(t) = \cos\left(\frac{t}{2}\right) \text{ on } -\pi < t < \pi$$

and find the Fourier series of this function.

(3) Solve the IVP Boas 443 problem 10 with Laplace transforms.