

Physics 321 – Spring 2017

Homework #10, Due at beginning of class Wednesday March 29

1. [10 pts] A “sawtooth wave” can be defined by $F(t) = t$ for $-\pi/\omega < t < +\pi/\omega$, with $F(t)$ defined at all other values of the time t by the property of having period $2\pi/\omega$.

Find the Fourier series representation of this $F(t)$. Express your answer BOTH in exponential form and in the form of sines and/or cosines. But get the exponential form first (it’s easier); and then get the constant + sines + cosines form from that.

2. [10 pts] Taylor Problem 6.9: Find the Equation of the path from $(0,0)$ to $(1,1)$ in the (x,y) plane that makes the integral

$$\int (y'^2 + yy' + y^2) dx$$

stationary.