Biermann CompPhys HW7

Emily Biermann

October 10 2020

1 CH6 EX1-3

See code.

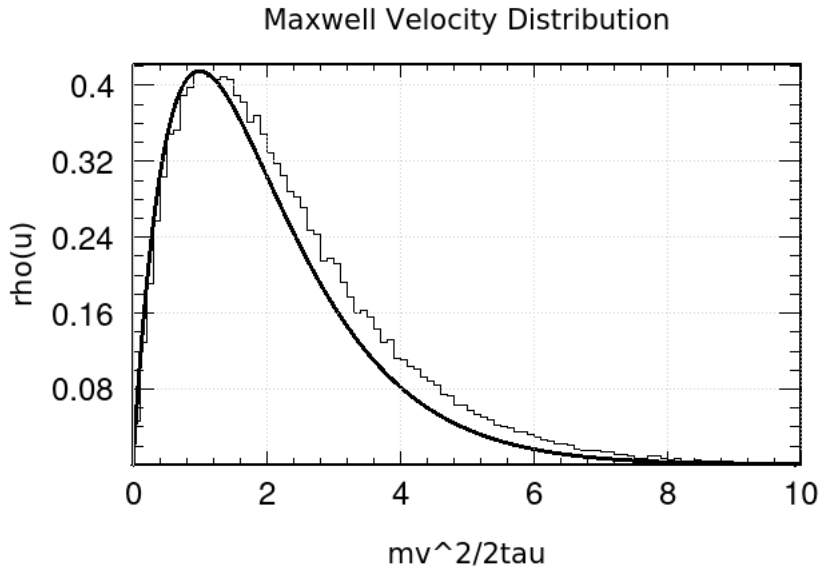
2 CH7 EX2

First we perform a change of variable:

$u^2 = \frac{2\tau}{m} v^2$

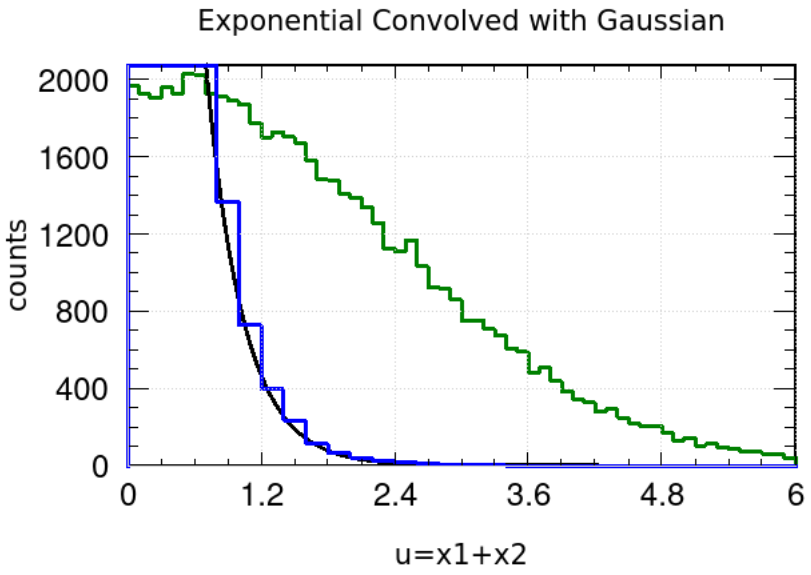
The distribution becomes

$\rho(u)du = \frac{2}{\sqrt{\pi}} u e^{-u} du$



3 CH7 EX5

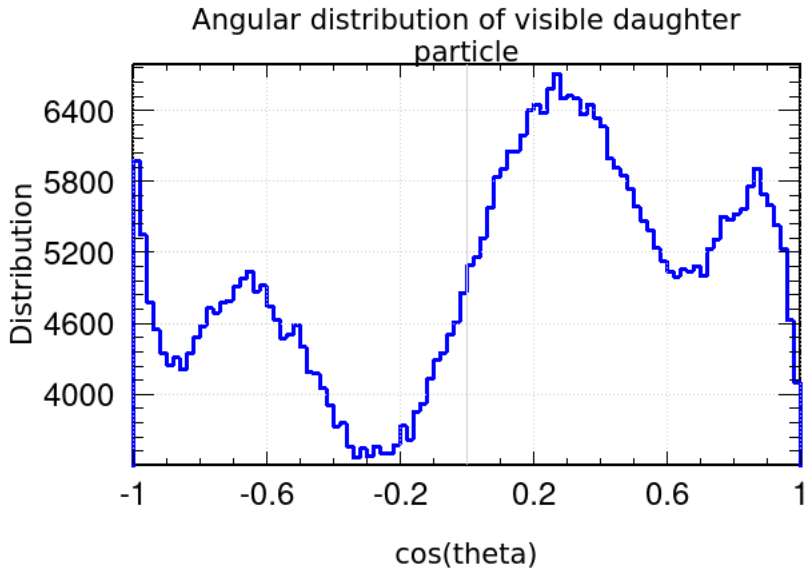
Figure 1: Analytic Convolution (black), Histogram of sum (green), and rejection method (blue)



4 CH7 EX6

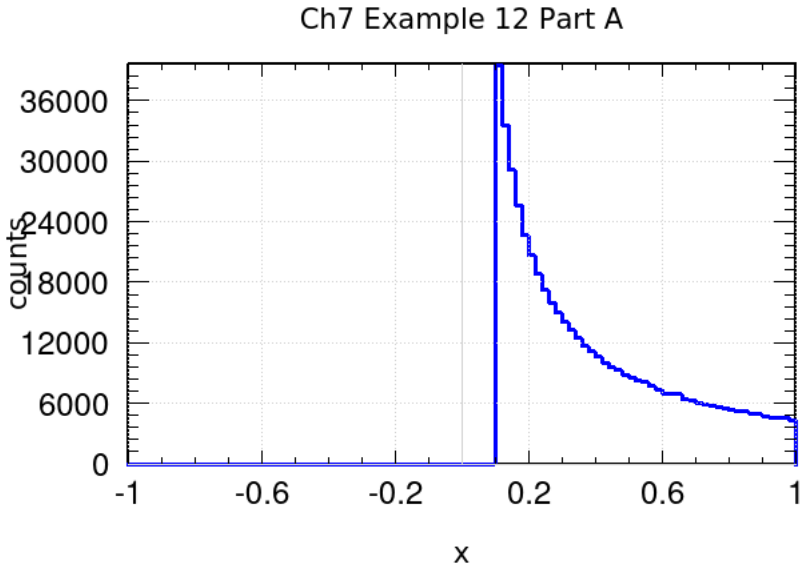
Since $-1 \leq x \geq 1$ each Legendre polynomial has extrema values of ± 1. Therefore the maximum value of our distribution is
$P_{max} = \frac{\sqrt{3}}{\sqrt{8}} + \frac{\sqrt{7}}{\sqrt{6}} + \frac{\sqrt{14}}{\sqrt{24}} + \frac{\sqrt{15}}{\sqrt{16}}$

and we can use the rejection method to model the distribution.



I could not figure out how to properly scale the histogram so that the analytical solution would also show up on the graph.

5 CH7 EX12



I could not get part B to run.