Theoretical Elementary Particle Physics
Exercise 7

31 January 2019

1 Parton model (100 points)

Starting from the cross section for the elastic scattering of unpolarized electrons from spinless point-like particles

$$\frac{d\sigma}{d\Omega}\Big|_{\text{lab.}} = \frac{\alpha^2}{4E^2 \sin^4 \frac{\theta}{2}} \frac{E'}{E} \cos^2 \frac{\theta}{2} \tag{1}$$

show, that if quarks had spin 0, $F_2(x_B)$ would still be

$$F_2(x) = x_B \sum_q e_q^2 q(x_B) \, , \tag{2}$$

but that $F_1(x_B) = 0$.