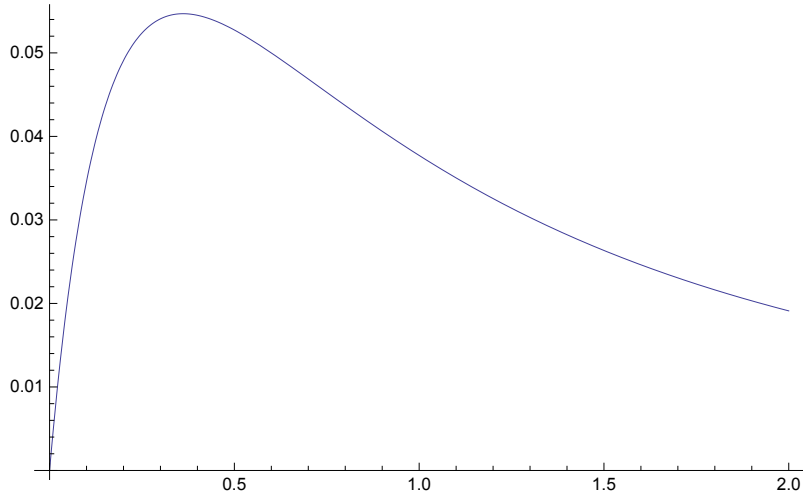


Parametrization of the neutron form factor as a function of q^2 ($q^2 > 0$)

$$G_{En}[q^2] := - \frac{\mu_n a (q^2 / (4 M^2))}{1 + b (q^2 / (4 M^2))} (1 + q^2 / M^2)^{-2}$$

$hb = 0.19733$; $\mu_n = -1.913$; $a = 0.942$; $b = 4.65$; $Md = 0.84 / hb$; $M = 0.939 / hb$;

`Plot[GEn[q2/hb^2], {q2, 0, 2}]`



`Series[GEn[q2], {q2, 0, 1}]`

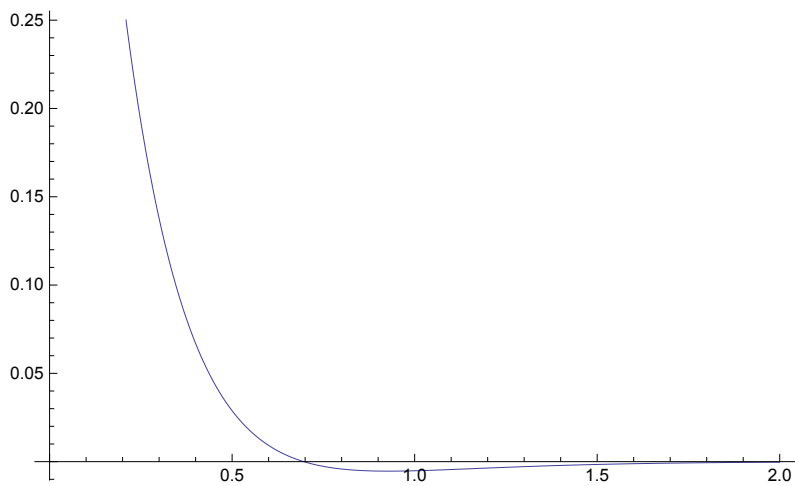
$0.0198958 q^2 + O[q^2]^2$

`msr = -6 D[GEn[q2], q2] /. q2 -> 0`

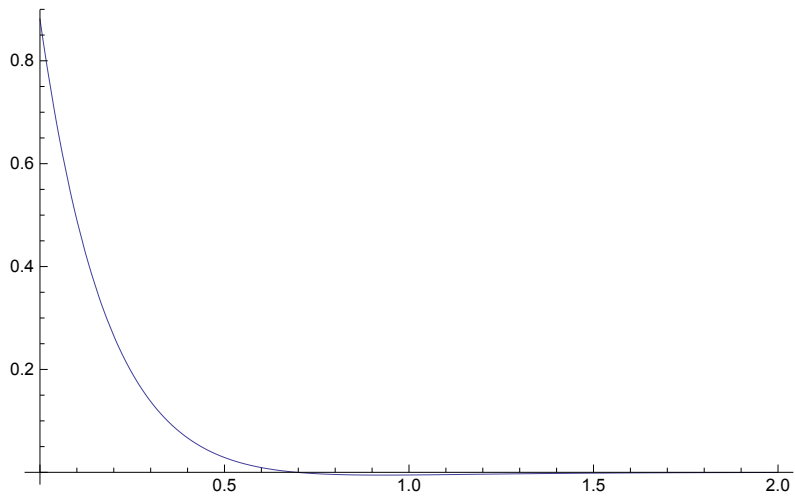
-0.119375

$$\rho[r] := \text{Integrate}\left[\frac{q^2}{2\pi^2} \frac{\sin[qr]}{qr} G_{En}[q^2], \{q, 0, \infty\}\right]$$

`Plot[ρ[r], {r, 0, 2}]`



```
Plot[ $\rho[r]$ , {r, 0, 2}, PlotRange  $\rightarrow$  Full]
```



```
Plot[ $\rho[r]$ , {r, 0, 2}]
```

The neutron has a positive core and a negative cloud

```
Plot[ $4 \pi r^2 \rho[r]$ , {r, 0, 2}]
```

