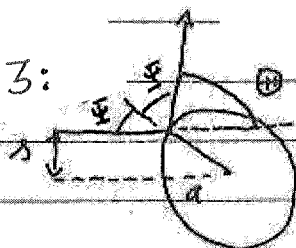


Oppg 3:



Spredningsvinkel Θ oppfyller $2\Phi + \Theta = \pi$

For figuren er støtparameteren $s = a \sin(\frac{\pi}{2} - \frac{\Theta}{2}) = a \cos \frac{\Theta}{2}$

$$\therefore |ds/d\Theta| = (a/2) \sin \Theta/2$$

$$\sigma(\Theta) = \frac{s}{\sin \Theta} \left| \frac{ds}{d\Theta} \right| = \frac{a \cos \Theta/2}{\sin \Theta} \cdot \frac{a}{2} \sin \frac{\Theta}{2} = \frac{a^2}{4}, \text{ uavhengig av } \Theta.$$

$$\text{Totalt tværsnitt } \underline{\sigma} = 2\pi \int_0^{\pi} \sigma(\Theta) \sin \Theta d\Theta = \pi a^2, \text{ rimelig nok}$$

Oppg 4:

$$\text{Går ut fra } \Theta = \pi - 2 \int_0^{u_m} \frac{s du}{\sqrt{1 - \frac{V(u)}{E} - s^2 u^2}},$$

hvor $u_m = 1/r_m$ er inners minste avstand.

$$f = -dV/dr = k/r^3 \text{ gir } V = \frac{1}{2} k/r^2 = \frac{1}{2} k u^2, \Rightarrow$$

$$\Theta = \pi - 2 \int_0^{u_m} \frac{s du}{\sqrt{1 - (\frac{k}{2E} + s^2) u^2}} = \pi - 2 \int_0^{u_m} \frac{s du}{\sqrt{1 - u^2/u_m^2}}, \text{ hvor}$$

$$u_m = \frac{1}{\sqrt{\frac{k}{2E} + s^2}}$$

$$\text{Integrerer: } \Theta = \pi - 2s u_m \left| \arcsin \frac{u}{u_m} \right|_0^{u_m} = \pi - \pi s u_m$$

Introduer $x = \Theta/\pi$:

$$x = 1 - \frac{s}{\sqrt{\frac{k}{2E} + s^2}}, \quad \frac{s^2}{\frac{k}{2E} + s^2} = (1-x)^2$$

$$s = \frac{\sqrt{\frac{k}{2E}}}{\sqrt{2x-x^2}} = s(x, E)$$

$$\text{Deriver: } \frac{ds}{dx} = -\sqrt{\frac{k}{2E}} \frac{1}{(2x-x^2)^{3/2}}$$

$$\sigma(\Theta) = \frac{s}{\sin \Theta} \left| \frac{ds}{d\Theta} \right| = \frac{s}{\pi \sin \pi x} \left| \frac{ds}{dx} \right| = \frac{1}{\pi \sin \pi x} \sqrt{\frac{k}{2E}} \frac{1-x}{\sqrt{2x-x^2}} \sqrt{\frac{k}{2E}} \frac{1}{(2x-x^2)^{3/2}}$$

$$\underline{\sigma(\Theta)} = \frac{k}{2\pi E} \frac{1-x}{x^2(2-x)^2 \sin \pi x}$$