Exercise & Problem 2

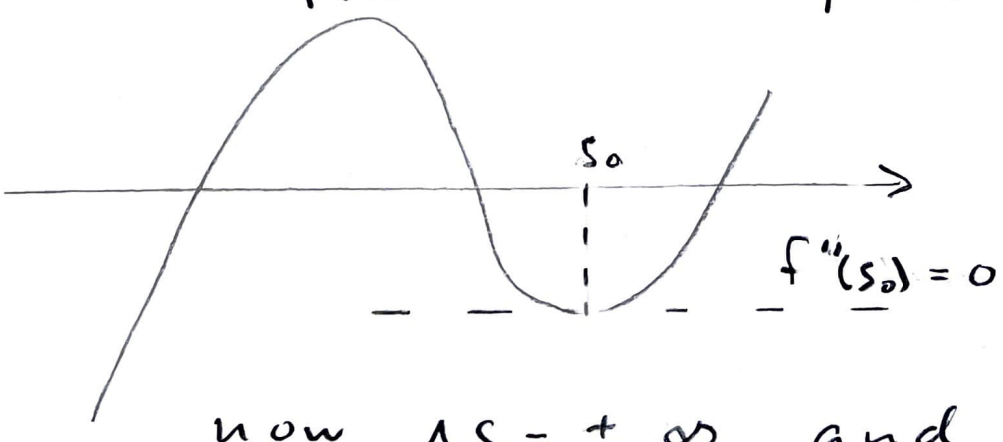
The difference between Newton's method and parabola fitting:

Newton's method requires knowledge of the first and second derivatives of $f(s)$.

Parabola fitting forces Δs to go through three points of function $f(s)$, no derivatives are required.

If no closed form of $f(s)$ is available, it is difficult to obtain $f'(s)$ and $f''(s)$. Parabola fitting can still be used.

Newton's method may hit a flat spot:



now $\Delta s = \pm \infty$ and Newton fails.

Parabolic fitting only fails if the whole function is linear

i.e. $f(s) = as^2 + bs + c$ and $a = 0$

$\rightarrow$ $F(s) = bs + c$.