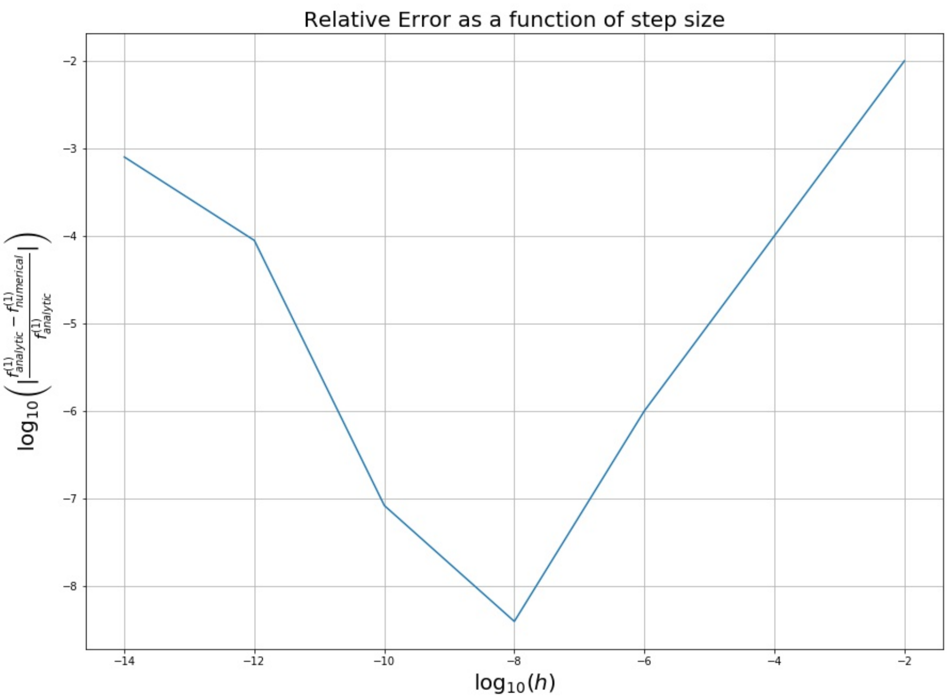

I denote $f(x+h)$ as f_h and $f(x+h)$ as f_{-h}. The function and its derivatives are evaluated at x_0 and is denoted by 0 on subscript.
Taylor expansion gives,

$$f_h = f_0 + f_0'h + \sum_{j=2}^{\infty} \frac{f_0^{(j)}}{j!} h^j$$

$$\implies \frac{f_h - f_0}{h} = f_0' + \sum_{j=2}^{\infty} \frac{f_0^{(j)}}{j!} h^{j-1}$$

So the associated Truncation error is $\epsilon_{tr}(h) = \frac{1}{2} f_0^{(2)} h$
However as h becomes small, there is a loss of precision due to round off error in the evaluation of $f_h - f_0$. Round off error goes as,

$$\left| \frac{f_h - f_0}{h} \right| \leq \frac{\epsilon_M}{h}$$

where ϵ_M is machine precision and equals to 10^{-6} for single precision and 10^{-15} for double precision.
So the total error,

$$\epsilon_{tot} = \frac{1}{2} f_0^{(2)} h + \frac{\epsilon_M}{h}$$

So the error is minimum at

$$h = \sqrt{\frac{2\epsilon_M}{f_0^{(2)}}}$$

For $f(x) = x(x-1)$ and for double precision at $x = 1$, $h \approx 4.47 \times 10^{-8}$
This is evident from the plot above.