Problem 5. Elastic thread ***(10 points)***

i. (5 pts) Using the tape, we fix one end of the thread to one end of the wooden rod (let it be point A), and press another end (or a point in the middle of the thread) to some point on the rod by finger (or also by using the tape; let it be the point B). Then we hang the load to the middle of that part of the thread, which is between the points A and B; this will be refferred to as the point C. Further we measure the final length of the thread l, together with the non-stretched length l_0, and calculate the tension T in the thread: $T = \frac{1}{2}mg\frac{AC}{CD}$, where D is the middle of the segment AB. By changing the length AB and the used thread length (the thread can be already stretched before hanging the load), we can cover the range from $l \approx 1.1\, l_0$ to $l \approx 4.5\, l_0$.

ii. (5 pts) Note that $\varepsilon S = \frac{l-l_0}{l_0}S = \frac{V}{l_0} - S$, i.e. $V = (\varepsilon+1)S = \frac{T}{E\varepsilon}(\varepsilon+1) = \frac{T}{E}(1+\varepsilon^{-1})$. Since we are interested in the relative change of V, it suffices to plot $T(1+\varepsilon^{-1})$ (which is V/E) versus ε.