Problems (Self-study)

1. Write down all necessary MATLAB commands to plot in a **single frame** the graphs of functions $(x) = \frac{1}{1+ e^{-x}}$, $g(x) = \frac{1}{1+ e^{-2x}}$ and $v(x) = \frac{1}{1+ e^{-4x}}$ in the interval [-4, 4] with 32 equally spaced points. The graph of $f(x)$ should be a black solid line with a square marker, the graph of $g(x)$ should be a magenta dashed line with diamond marker and the graph of $v(x)$ should be a blue dotted line with plus marker. Indicate the names of the functions in the figure. The title of the figure should be 'Approximations of Heaviside step function'.
2. Write down all necessary MATLAB commands to plot separately in a **composite frame** (1-by-3 grid of subplots) the graphs of functions $(t) = \frac{1}{1+ e^{-t}}$, $g(t) = \frac{1}{1+ e^{-2t}}$ and $v(t) = \frac{1}{1+ e^{-4t}}$ in the interval [-4, 4] with 100 equally spaced points. For each graph write the name of the x-axis as 'time' and the name of the y-axis as 'energy'. Indicate the name of each function in the title name.

3.

Example *Draw graphs of the functions*

$i)\quad y = \frac{\sin x}{x} \qquad ii)\quad u = \frac{1}{(x-1)^2} + x$

$iii)\quad v = \frac{x^2+1}{x^2-4} \qquad iv)\quad w = \frac{(10-x)^{1/3}-2}{(4-x^2)^{1/2}}$

for $0 \le x \le 10$.