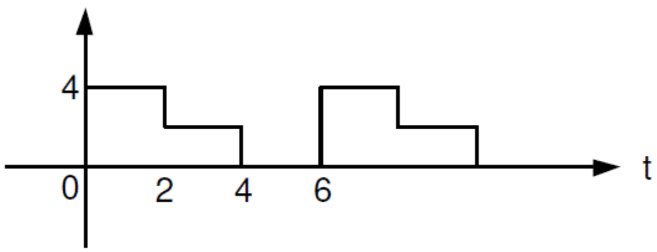
Answer the following questions for given below

1.




a) Find its period T and first term of Fourier series $a_0$

b) Find its Fourier series coefficients $a_n$ and $b_n$ then represent the signal with Fourier series.

c) Find its Fourier series by direct method.

$$x(t) = \sum_{k=-\infty}^{k=+\infty} X[k] e^{jkw_0 t} \qquad X[k] = \frac{1}{T}\int_T x(t) e^{-jkw_0 t} dt$$

$$x_N(t) = \sum_{k=-N}^{k=+N} X[k] e^{jkw_0 t} \qquad w_0 = \frac{2\pi}{T}$$

d) Show that part b and part c gives the same result don't forget $a_0$ for part c.

e) Write 2 matlab codes for part b and c that gives same result.

2. Answer the following questions for the given transfer function bellow

$$G(s) = \frac{7s^2 + 63s + 134}{(s+3)(s+4)(s+5)}$$

a) Form given transfer function G(s) by using **tf(.)** function and obtain poles and zeros of G(s) by using **pole(.),zero(.)** functions in MATLAB

b) Plot poles and zeros of G(s) (obtained previously in **Part a)**) in complex s-plane by using **real(.),imag(.)** functions in MATLAB

c) Evaluate Inverse Laplace Transform of transfer function G(s), as g(t), via Partial Fraction Expansion, analytically

d) Evaluate Inverse Laplace Transform of transfer function G(s), as g(t), via Residue Theorem, analytically and check your results evaluated previously in **Part c)**

e) Plot the real valued function g(t) (evaluated previously in **Part c)**) with respect to t in MATLAB where $0 \le t \le 2\pi$

3. Answer the following questions for the given transfer function bellow

$$G(s) = \frac{s^3+s^2-s+3}{s^5-s}$$

f) Form given transfer function G(s) by using **tf(.)** function and obtain poles and zeros of G(s) by using **pole(.),zero(.)** functions in MATLAB

g) Plot poles and zeros of G(s) (obtained previously in **Part a)**) in complex s-plane by using **real(.),imag(.)** functions in MATLAB

h) Evaluate Inverse Laplace Transform of transfer function G(s), as g(t), via Partial Fraction Expansion, analytically

i) Evaluate Inverse Laplace Transform of transfer function G(s), as g(t), via Irreducible Quadratic Form, analytically and check your results evaluated previously in **Part c)**

j) Plot the real valued function g(t) (evaluated previously in **Part c)**) with respect to t in MATLAB where $0 \leq t \leq 2\pi$