NA 2017 W7

PROBLEM 1

Use linear least square method (x=ao+a1*x) **by hand** to fit data to the following equation

X	2	3	4	7
Y	9	6	5	10

PROBLEM 2

Fit **cubic spline** interpolation Formula to the following equation **by computer**

X	Y
0	0
1	1
2	4
3	8

PROBLEM 3

Enthapy of a saturated water will be approximated by the equation

$$h_f = A + Bt + Ct^2 + Dt^3$$

Following data is taken from the thermodynamic table. Find the polynomial coefficient by **using least square computer program**

t, ^oC	10	30	50	70	90
h_f , kJ/kg	41.99	125.66	209.26	292.97	376.94

PROBLEM 4

Force aplied to a linear spring is given with the Formula F=kx according to Hooke law. In this equation k is the spring constant and x is the displacement. Experiment is being carried out and found the following results between displacement and Force. Estimate spring constant k (**use computer programs**)

a) By using Newton Interpolation Formula

b) By using Lagrange interpolation Formula

c) By using least square curve fitting

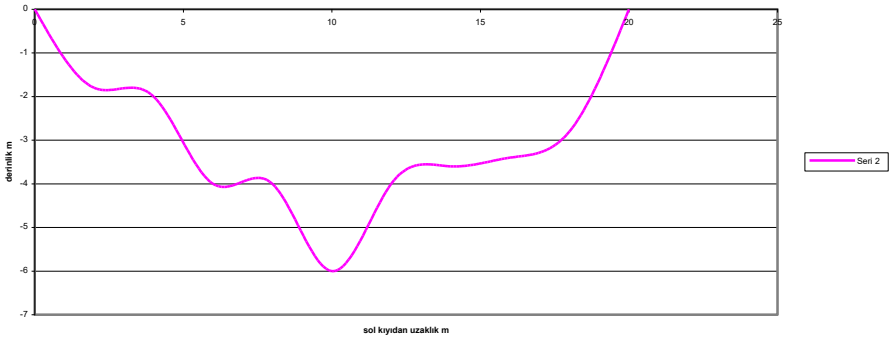
X, m	0.02	0.04	0.06	0.08	0.1
F, kN	3.1	6.1	9.2	12	15.1

PROBLEM 5

Depth (H) and velocity (U) profile of a channel is given belove

x, m	0	2	4	6	8	10	12	14	16	18	20	

H, m	0	1.8	2	4	4	6	4	3.6	3.4	2.8	0	
U m/s	0	0.03	0.045	0.055	0.065	0.12	0.07	0.06	0.05	0.04	0	



Curve fit to H(x) and U(x) functions by using (Computer programming)

a) Cubic spline interpolation formula
b) Polinomial least sqare formula
c) Lagrange interpolation formula

PROBLEM 6

Thermal conductivity coefficient of water for different temperature values are given in the belove table

Teöperature ***T*** . [K]	275	290	305	320	340	360
Thermal conductivity coefficient ***k***. [W/(m·K)]	0.574	0.598	0.620	0.640	0.660	0.674

a-) curvefit the following equation to thermal conductivity-temperature relation by using hand calculations:

$$k = A \cdot T + B \quad .$$

b-) Calculate thermal conduvtivity for T=300 K .

PROBLEM 7

Enthapy of a saturated water will be approximated by the following equation

$$h_f = A + Bt + Ct^2 + Dt^3$$

Following data is taken from the thermodynamic table. Find the polynomial coefficient by using polinomial least square by hand calculations

t, ^oC	10	30	50	70	90
h_f , kJ/kg	41.99	125.66	209.26	292.97	376.94