

**MAT 322 MATEMATİKSEL DENKLEMLERİN BİLGİSAYAR DESTEKLİ  
ÇÖZÜMLERİ II ARASINAV CEVAP ANAHTARI**

**C-1)**

```
ClearAll[a,b,h,M,t,y,data1];
a=0;
b=0.5;
h=0.1;
M=(b-a)/h;
t[0]=0;
y[0]=1;
Do[t[k+1]=t[k]+h;y[k+1]=y[k]+h*(2-Exp[-4*t[k]]-2*y[k]),{k,0,M-1}];
data1=Table[{t[k],y[k]},{k,0,M}];
```

**C-2)**

```
ClearAll[de,inits,DE,Y,y];
de=y''[t]+4*y[t]==Sin[3*t];
inits={y[0]->0,y'[0]->0};
DE=LaplaceTransform[de,t,s];
Y=Solve[DE,LaplaceTransform[y[t],t,s]];
Y[[1]];
Y=%[[1,2]];
Y=Y/.inits;
y=InverseLaplaceTransform[Y,s,t]//Expand;
```

**C-3)**

```
ClearAll[f,x,y,M];
f[x_,y_]:=1+y*y
x[0]=0;
y[0][x]=0;
M=5;
Do[y[k+1][x]=y[0][x]+Integrate[f[x,y[k][x]]/.x->s,{s,x[0],x}];y[k+1][x],{k,0,M-1}];
```

**C-4)**

```
ClearAll[myPowerSeries,myODE,myIC,myODESeries,myAlgebraicEqns,seriesCoef,mySeriesSol];
myPowerSeries=Series[y[t],{t,1,5}];
myODE=t*t*y''[t]-2*t*y'[t]-10y[t]==0;
myIC={y[1]->5,y'[1]->4};
myODESeries=myODE/.y[t]->myPowerSeries;
myAlgebraicEqns=LogicalExpand[myODESeries]/.myIC;
seriesCoef=First[Solve[myAlgebraicEqns]];
mySeriesSol=myPowerSeries/.seriesCoef/.myIC;
Normal[mySeriesSol];
```

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