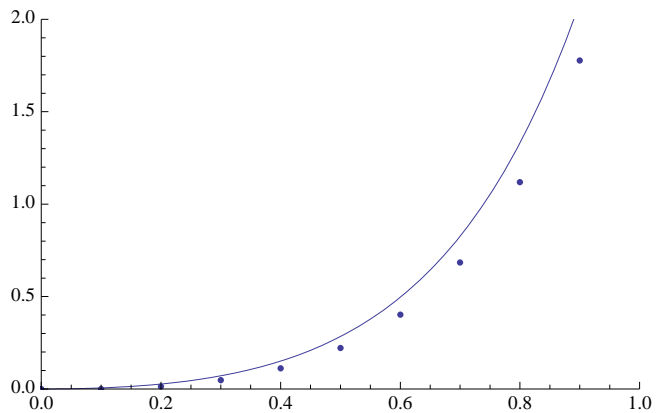```
Quit[];

(* Esercizio 5.2.1 *)

(* a *) f[t_, y_] := t * e ^ (3 t) - 2 y;
α = 0.;
tA = 0.0; tB = 1.;
n = 10;
h = (tB - tA) / n;
t[0] = tA;
t[n] = tB;
Do[t[i + 1] = t[i] + h, {i, 0, n - 1}]
w[0] = α;
Do[w[i + 1] = w[i] + h * f[t[i], w[i]], {i, 0, n - 1}];
sol = Table[{t[i], w[i]}, {i, 0, n}];
solnum = NDSolve[{y'[t] == f[t, y[t]], y[tA] == α}, y[t], {t, tA, tB}][[1]];
(*soltrue=DSolve[{y'[t]==f[t,y[t]],y[tA]==α},y[t],t][[1]]*)
trange = {tA, tB};
yrange = {0, 2};
pl1 = ListPlot[sol, PlotRange → {trange, yrange}];
pl2 = Plot[y[t] /. solnum, {t, tA, tB}, PlotRange → {trange, yrange}];
(*pl3=
  Plot[y[t]/.soltrue,{t,tA,tB},PlotRange→{trange,yrange},PlotStyle→RGBColor[1,0,0]];*)
Show[
 pl1,
 pl2]
```

```
(* b *) f[t_, y_] := 1 + (t - y) ^ 2;
α = 1.;
tA = 2.; tB = 3.;
n = 2;
h = (tB - tA) / n
t[0] = tA;
t[n] = tB;
Do[t[i + 1] = t[i] + h, {i, 0, n - 1}]
w[0] = α;
Do[w[i + 1] = w[i] + h * f[t[i], w[i]], {i, 0, n - 1}];
sol = Table[{t[i], w[i]}, {i, 0, n}];
solnum = NDSolve[{y'[t] == f[t, y[t]], y[tA] == α}, y[t], {t, tA, tB}][[1]];
(*soltrue=DSolve[{y'[t]==f[t,y[t]],y[tA]==α},y[t],t][[1]]*)
trange = {tA, tB};
yrange = {0, 2};
pl1 = ListPlot[sol, PlotRange → {trange, yrange}];
pl2 = Plot[y[t] /. solnum, {t, tA, tB}, PlotRange → {trange, yrange}];
(*pl3=
  Plot[y[t]/.soltrue,{t,tA,tB},PlotRange→{trange,yrange},PlotStyle→RGBColor[1,0,0]];*)
Show[
 pl1,
 pl2]
```

0.5