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(*)
interpolare Lagrange - forma parametrica
comportamentul la translatii, rotatii
*)

In[ ]:= t0 = 0;
t1 = 1 / 2;
t2 = 1;

In[ ]:= Lt0[t_] := 
$$\frac{(t - t1) (t - t2)}{(t0 - t1) (t0 - t2)};$$

Lt1[t_] := 
$$\frac{(t - t0) (t - t2)}{(t1 - t0) (t1 - t2)};$$

Lt2[t_] := 
$$\frac{(t - t0) (t - t1)}{(t2 - t0) (t2 - t1)};$$


In[ ]:= x0 = 1; y0 = 0; z0 = 1;
x1 = 1; y1 = -1; z1 = 2;
x2 = 0; y2 = 1; z2 = 2;

In[ ]:= Lt[t_] := Lt0[t] {x0, y0, z0} + Lt1[t] {x1, y1, z1} + Lt2[t] {x2, y2, z2}

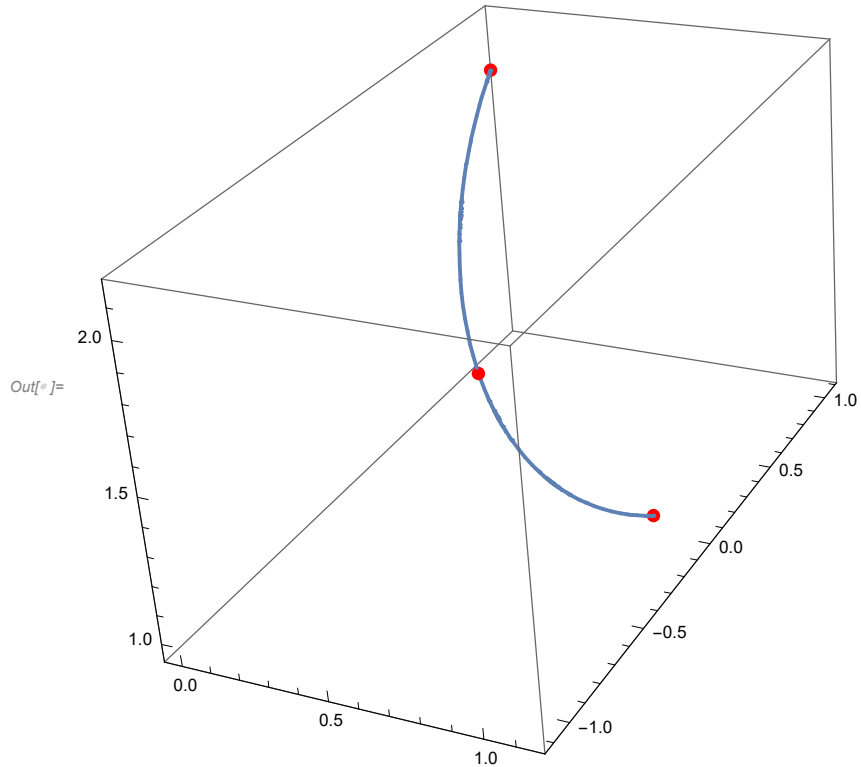
In[ ]:= Lt[t_] // Expand
Out[ ]:=  $\{1 + t - 2 t^2, -5 t + 6 t^2, 1 + 3 t - 2 t^2\}$ 

In[ ]:= c1 = ParametricPlot3D[Lt[t], {t, t0, t2}];

In[ ]:= PA = Graphics3D[{Red, PointSize[Large], Point[{x0, y0, z0}]}];
PB = Graphics3D[{Red, PointSize[Large], Point[{x1, y1, z1}]}];
PC = Graphics3D[{Red, PointSize[Large], Point[{x2, y2, z2}]}];

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In[ ]:= Show[c1, PA, PB, PC]
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(* exemplul 1 *)

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In[ ]:= A = {{1/√2, 1/√3, 1/√6}, {1/√2, -1/√3, -1/√6}, {0, 1/√3, -2/√6}};
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(* exemplul 2 = rotatie in jurul axei Oy *)

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In[ ]:= th0 = Pi / 3;
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In[ ]:= A = {{Cos[th0], 0, -Sin[th0]}, {0, 1, 0}, {Sin[th0], 0, Cos[th0]}}
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Out[ ]:= {{1/2, 0, -√3/2}, {0, 1, 0}, {√3/2, 0, 1/2}}
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In[ ]:= A // MatrixForm
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Out[ ]//MatrixForm=
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$$\begin{pmatrix} \frac{1}{2} & 0 & -\frac{\sqrt{3}}{2} \\ 0 & 1 & 0 \\ \frac{\sqrt{3}}{2} & 0 & \frac{1}{2} \end{pmatrix}$$

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In[ ]:= A.Transpose[A] // Simplify
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Out[ ]:= {{1, 0, 0}, {0, 1, 0}, {0, 0, 1}}
```

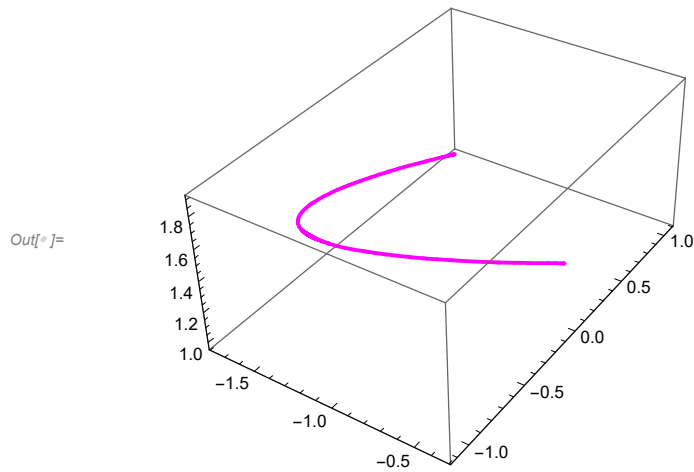
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In[ ]:= {u0, v0, w0} = {x0, y0, z0}.Transpose[A];
        {u1, v1, w1} = {x1, y1, z1}.Transpose[A];
        {u2, v2, w2} = {x2, y2, z2}.Transpose[A];

In[ ]:= Lt[t_] := Lt0[t] {u0, v0, w0} + Lt1[t] {u1, v1, w1} + Lt2[t] {u2, v2, w2}

In[ ]:= c2 = ParametricPlot3D[Lt[t], {t, t0, t2}, PlotStyle -> Magenta]

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In[ ]:= PA = Graphics3D[{Green, PointSize[Large], Point[{u0, v0, w0}]}];
        PB = Graphics3D[{Green, PointSize[Large], Point[{u1, v1, w1}]}];
        PC = Graphics3D[{Green, PointSize[Large], Point[{u2, v2, w2}]}];

In[ ]:= Show[c2, PA, PB, PC, c1, PA, PB, PC]

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