In[•]:=
```
Clear["Global`*"]
lösche
n1 = 1/Sqrt[2];
      Quadratwurzel
n2 = n1;

n3 = 0;
R = {{n1^2 (1 - Cos[α]) + Cos[α],
               Kosinus    Kosinus
    n1 * n2 (1 - Cos[α]) - n3 * Sin[α], n1 * n3 (1 - Cos[α]) + n2 * Sin[α]},
                Kosinus         Sinus               Kosinus         Sinus
   {n2 * n1 (1 - Cos[α]) + n3 * Sin[α], n2^2 (1 - Cos[α]) + Cos[α],
                Kosinus         Sinus            Kosinus    Kosinus
    n2 * n3 (1 - Cos[α]) - n1 * Sin[α]}, {n3 * n1 (1 - Cos[α]) - n2 * Sin[α],
                Kosinus         Sinus                  Kosinus         Sinus
    n3 * n2 (1 - Cos[α]) + n1 * Sin[α], n3^2 (1 - Cos[α]) + Cos[α]}};
                Kosinus         Sinus            Kosinus    Kosinus


d = R.(s * {1, 0, 0} + t * {0, 1, 0}) + m {mx, my, 0};

a = {ax, ay, az};
b = {bx, by, bz};
h = {hx, hy, hz};
f = h + u * a;
d == f
Solve[d == f, {s, t, u}]
löse
```

Out[•]=

$$\left\{m\,mx + \frac{1}{2} t \left(1 - \mathrm{Cos}[\alpha]\right) + s \left(\frac{1}{2} \left(1 - \mathrm{Cos}[\alpha]\right) + \mathrm{Cos}[\alpha]\right),\ m\,my + \frac{1}{2} s \left(1 - \mathrm{Cos}[\alpha]\right) + t \left(\frac{1}{2} \left(1 - \mathrm{Cos}[\alpha]\right) + \mathrm{Cos}[\alpha]\right),\ -\frac{s\,\mathrm{Sin}[\alpha]}{\sqrt{2}} + \frac{t\,\mathrm{Sin}[\alpha]}{\sqrt{2}}\right\} == \{hx + ax\,u,\ hy + ay\,u,\ hz + az\,u\}$$

Out[•]=

$$\Bigg\{\Bigg\{s \to -\Bigg(\Bigg(\left(-ay\,hz - az\left(-hy + m\,my\right)\right)\left(-\frac{1}{2} az \left(1 - \mathrm{Cos}[\alpha]\right) + \frac{ax\,\mathrm{Sin}[\alpha]}{\sqrt{2}}\right) - \left(-ax\,hz - az\left(-hx + m\,mx\right)\right)\left(-az\left(\frac{1}{2}\left(1 - \mathrm{Cos}[\alpha]\right) + \mathrm{Cos}[\alpha]\right) + \frac{ay\,\mathrm{Sin}[\alpha]}{\sqrt{2}}\right)\Bigg) \Bigg/ \left(-az^2\,\mathrm{Cos}[\alpha] - \frac{ax\,az\,\mathrm{Sin}[\alpha]}{\sqrt{2}} + \frac{ay\,az\,\mathrm{Sin}[\alpha]}{\sqrt{2}}\right)\Bigg),$$

$$t \to -\Big(\Big(az\,hx - az\,hy - ax\,hz + ay\,hz - az\,m\,mx + az\,m\,my - az\,hx\,\mathrm{Cos}[\alpha] - az\,hy\,\mathrm{Cos}[\alpha] + ax\,hz\,\mathrm{Cos}[\alpha] + ay\,hz\,\mathrm{Cos}[\alpha] + az\,m\,mx\,\mathrm{Cos}[\alpha] + az\,m\,my\,\mathrm{Cos}[\alpha] + \sqrt{2}\,ay\,hx\,\mathrm{Sin}[\alpha] - \sqrt{2}\,ax\,hy\,\mathrm{Sin}[\alpha] - \sqrt{2}\,ay\,m\,mx\,\mathrm{Sin}[\alpha] + \sqrt{2}\,ax\,m\,my\,\mathrm{Sin}[\alpha]\Big) \Big/ \left(2\,az\,\mathrm{Cos}[\alpha] + \sqrt{2}\,ax\,\mathrm{Sin}[\alpha] - \sqrt{2}\,ay\,\mathrm{Sin}[\alpha]\right)\Big),$$

$$u \to -\frac{2\,hz\,\mathrm{Cos}[\alpha] + \sqrt{2}\,hx\,\mathrm{Sin}[\alpha] - \sqrt{2}\,hy\,\mathrm{Sin}[\alpha] - \sqrt{2}\,m\,mx\,\mathrm{Sin}[\alpha] + \sqrt{2}\,m\,my\,\mathrm{Sin}[\alpha]}{2\,az\,\mathrm{Cos}[\alpha] + \sqrt{2}\,ax\,\mathrm{Sin}[\alpha] - \sqrt{2}\,ay\,\mathrm{Sin}[\alpha]}\Bigg\}\Bigg\}$$

In[∘]:=
```
hessNorm = R.{0, 0, 1}
hess = hessNorm.(f - m {mx, my, 0}) == 0
Solve[hess, u]
```
löse

Out[∘]= $$\left\{\frac{\text{Sin}[\alpha]}{\sqrt{2}}, -\frac{\text{Sin}[\alpha]}{\sqrt{2}}, \text{Cos}[\alpha]\right\}$$

Out[∘]= $$(hz + az\,u)\,\text{Cos}[\alpha] + \frac{(hx - m\,mx + ax\,u)\,\text{Sin}[\alpha]}{\sqrt{2}} - \frac{(hy - m\,my + ay\,u)\,\text{Sin}[\alpha]}{\sqrt{2}} == 0$$

Out[∘]= $$\left\{\left\{u \to \frac{-2\,hz\,\text{Cos}[\alpha] - \sqrt{2}\,hx\,\text{Sin}[\alpha] + \sqrt{2}\,hy\,\text{Sin}[\alpha] + \sqrt{2}\,m\,mx\,\text{Sin}[\alpha] - \sqrt{2}\,m\,my\,\text{Sin}[\alpha]}{2\,az\,\text{Cos}[\alpha] + \sqrt{2}\,ax\,\text{Sin}[\alpha] - \sqrt{2}\,ay\,\text{Sin}[\alpha]}\right\}\right\}$$

In[∘]:= $$\mathbf{u = \frac{-2\,hz\,Cos[\alpha] - \sqrt{2}\,hx\,Sin[\alpha] + \sqrt{2}\,hy\,Sin[\alpha] + \sqrt{2}\,m\,mx\,Sin[\alpha] - \sqrt{2}\,m\,my\,Sin[\alpha]}{2\,az\,Cos[\alpha] + \sqrt{2}\,ax\,Sin[\alpha] - \sqrt{2}\,ay\,Sin[\alpha]};}$$

f

Out[∘]= $$\left\{hx + \frac{ax\left(-2\,hz\,\text{Cos}[\alpha] - \sqrt{2}\,hx\,\text{Sin}[\alpha] + \sqrt{2}\,hy\,\text{Sin}[\alpha] + \sqrt{2}\,m\,mx\,\text{Sin}[\alpha] - \sqrt{2}\,m\,my\,\text{Sin}[\alpha]\right)}{2\,az\,\text{Cos}[\alpha] + \sqrt{2}\,ax\,\text{Sin}[\alpha] - \sqrt{2}\,ay\,\text{Sin}[\alpha]},\right.$$
$$hy + \frac{ay\left(-2\,hz\,\text{Cos}[\alpha] - \sqrt{2}\,hx\,\text{Sin}[\alpha] + \sqrt{2}\,hy\,\text{Sin}[\alpha] + \sqrt{2}\,m\,mx\,\text{Sin}[\alpha] - \sqrt{2}\,m\,my\,\text{Sin}[\alpha]\right)}{2\,az\,\text{Cos}[\alpha] + \sqrt{2}\,ax\,\text{Sin}[\alpha] - \sqrt{2}\,ay\,\text{Sin}[\alpha]},$$
$$\left.hz + \frac{az\left(-2\,hz\,\text{Cos}[\alpha] - \sqrt{2}\,hx\,\text{Sin}[\alpha] + \sqrt{2}\,hy\,\text{Sin}[\alpha] + \sqrt{2}\,m\,mx\,\text{Sin}[\alpha] - \sqrt{2}\,m\,my\,\text{Sin}[\alpha]\right)}{2\,az\,\text{Cos}[\alpha] + \sqrt{2}\,ax\,\text{Sin}[\alpha] - \sqrt{2}\,ay\,\text{Sin}[\alpha]}\right\}$$