THE JACOBIAN MATRIX :

J := [a11, a12, a13, a14, a15, a16]
[a21, a22, a23, a24, a25, a26]
[0, 0, a33, a34, a35, a36]
[0, 0, a43, a44, a45, a46]
[0, 0, a53, a54, a55, a56]
[1, 1, 1, a64, a65, a66]

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F(t) := d6*(sin(q5(t))*sin(q3(t))*cos(q4(t))-sin(q5(t))*sin(q4(t))+cos(q3(t))*cos(q5(t)))

B(t) := cos(q3(t))*cos(q4(t))*sin(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q4(t))*
sin(q5(t))*d6*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q3(t))*cos(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+d3*sin(q1(t))*a2*cos(q2(t))

G(t) := cos(q3(t))*cos(q4(t))*sin(q5(t))*d6*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q4(t))*sin(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q3(t))*cos(q5(t))*d6*
(sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))+d3*cos(q1(t))*a2*cos(q2(t))

M(t) := cos(q3(t))*cos(q4(t))*sin(q5(t))*d6*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q4(t))*sin(q5(t))*d6(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q3(t))*cos(q5(t))*d6*(sin(q1(t))*s
in(q2(t))-cos(q1(t))*cos(q2(t)))+d3*cos(q1(t))*a2*cos(q2(t))-
d3*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))-a2*cos(q2(t))*(d3*cos(q1(t))-cos(q1(t)))

K(t) :=
cos(q3(t))*cos(q4(t))*sin(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q4(t))*sin(q5(t))*d6(
cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q3(t))*cos(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+a2*cos(q2(t))*(d3*sin(q1(t))-
sin(q1(t)))-d3*(sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))

p(t) := d6*(sin(q5(t))*sin(q3(t))*cos(q4(t))-sin(q5(t))*sin(q4(t))+cos(q3(t))*cos(q5(t)))

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a11 = -cos(q3(t))*cos(q4(t))*sin(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))-
sin(q4(t))*sin(q5(t))*d6*(cos(q1(t))*cos(q2(t))-
sin(q1(t))*sin(q2(t)))+sin(q3(t))*cos(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))-
a2*cos(q2(t))*(d3*sin(q1(t))+cos(q1(t)))-a1*sin(q1(t))
a12 = -cos(q3(t))*cos(q4(t))*sin(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))-
sin(q4(t))*sin(q5(t))*d6*(cos(q1(t))*cos(q2(t))-
sin(q1(t))*sin(q2(t)))+sin(q3(t))*cos(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))-
a2*cos(q2(t))*(d3*sin(q1(t))+cos(q1(t)))
a13 = F(t)*(sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))-B(t)
a14 = -p(t)*sin(q3(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))-k(t)*cos(q3(t))
a15 = p(t)*
(-cos(q3(t))*sin(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+cos(q4(t))*(cos(q1(t))*cos(q2(t))-
sin(q1(t))*sin(q2(t)))+K(t)*(sin(q3(t))*sin(q4(t))+cos(q4(t)))
a16 = p(t)*(sin(q5(t))*cos(q3(t))*cos(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q5(t))*

sin(q4(t))*(cos(q1(t))*cos(q2(t))- sin(q1(t))*cos(q2(t)))-
sin(q3(t))*cos(q5(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t))))-
(sin(q5(t))*sin(q3(t))*cos(q4(t)) - sin(q5(t))*sin(q4(t))+cos(q3(t))*cos(q5(t)))

a21 = cos(q3(t))*cos(q4(t))*sin(q5(t))*d6*(cos(q1(t(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q4(t))*sin(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q3(t))*cos(q5(t))*d6*(sin
(q1(t))*sin(q2(t))- cos(q1(t))*cos(q2(t)))+a2*cos(q2(t))*(d3*cos(q1(t))-sin(q1(t)))+a1*cos(q1(t))
a22 = cos(q3(t))*cos(q4(t))*sin(q5(t))*d6*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q4(t))*sin(q5(t))*d6*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q3(t))*cos(q5(t))*d6*(sin
(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))+a2*cos(q2(t))*(d3*cos(q1(t))-sin(q1(t)))
a23 = G(t)-F(t)*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))
a24 = M(t)*cos(q3(t))-p(t)*sin(q3(t))*(sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))
a25 = M(t)*(-sin(q3(t))*sin(q4(t))-cos(q4(t)))-p(t)*(cos(q3(t))*sin(q4(t))*(sin(q1(t))*sin(q2(t))-
cos(q1(t))*sin(q2(t)))-cos(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t))))
a26 = M(t)*(sin(q5(t))*sin(q3(t))*cos(q4(t))-sin(q5(t))*sin(q4(t))+cos(q3(t))*cos(q5(t)))-
p(t)*(sin(q5(t))*cos(q3(t))*cos(q4(t))*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q5(t))*sin(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q3(t))*cos(q5(t))*(sin(q1(t))*
sin(q2(t))-cos(q1(t))*cos(q2(t))))

a33 = B(t)*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))-G(t)*(sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))
a34 = K(t)*sin(q3(t))*(sin(q1(t))*sin(q2(t))-
cos(q1(t))*cos(q2(t)))+M(t)*sin(q3(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))
a 35 = K(t)*(cos(q3(t))*sin(q4(t))*(sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))-
cos(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t))))-
M(t)*(cos(q3(t))*sin(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*
cos(q2(t)))+cos(q4(t))*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t))))
a36 = K(t)*(sin(q5(t))*cos(q3(t))*cos(q4(t))*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q5(t))*sin(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q3(t))*cos(q5(t))*(sin(q1(t))*
sin(q2(t))- cos(q1(t))*cos(q2(t))))-M(t)*(sin(q5(t))*cos(q3(t))*cos(q4(t))*(cos(q1(t))*sin(q2(t))+
sin(q1(t))*cos(q2(t)))+sin(q5(t))*sin(q4(t))*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q3(t))*cos(q5(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t))))

a43 = cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t))
a44 = sin(q3(t))*(sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))
a45 = cos(q3(t))*sin(q4(t))*(sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t)))-
cos(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))
a46 = sin(q5(t))*cos(q3(t))*cos(q4(t))*(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))-
sin(q5(t))*sin(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q3(t))*cos(q5(t))*(sin(q1(t))*
sin(q2(t))-cos(q1(t))*cos(q2(t)))

a53 = sin(q1(t))*sin(q2(t))-cos(q1(t))*cos(q2(t))
a54 = -sin(q3(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))
a55 = -cos(q3(t))*sin(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+cos(q4(t))*(cos(q1(t))*
cos(q2(t))-sin(q1(t))*sin(q2(t)))
a56 = sin(q5(t))*cos(q3(t))*cos(q4(t))*(cos(q1(t))*sin(q2(t))+sin(q1(t))*cos(q2(t)))+sin(q5(t))*sin(q4(t))*
(cos(q1(t))*cos(q2(t))-sin(q1(t))*sin(q2(t)))sin(q3(t))*cos(q5(t))*(cos(q1(t))*sin(q2(t))+
sin(q1(t))*cos(q2(t)))

a64 = cos(q3(t))
a65 = -sin(q3(t))*sin(q4(t))-cos(q4(t))
a66 = sin(q5(t))*sin(q3(t))*cos(q4(t))-sin(q5(t))*sin(q4(t))+cos(q3(t))*cos(q5(t))

THE DERIVATIVE OF THE JACOBIAN MATRIX :

Diff(J(t),t) :=

[a11diff,	a12diff,	a13diff,	a14diff,	a15diff,	a16diff]
[a21diff,	a22diff,	a23diff,	a24diff,	a25diff,	a26diff]
[0,	0,	a33 diff,	a34 diff,	a35 diff,	a36diff]
[0,	0,	a43 diff,	a44 diff,	a45 diff,	a46diff]
[0,	0,	a53 diff,	a54 diff,	a55diff,	a56diff]
[0,	0,	0,	a64 diff,	a65diff,	a66diff]

a11diff =

```
sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*sin(q4)*q4diff*s
in(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*cos(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-cos(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-sin(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*sin(q1)+cos(q1))-
a2*cos(q2)*(d3*cos(q1)*q1diff-sin(q1)*q1diff)-a1*cos(q1)*q1diff;
```

a12diff =

```
sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*sin(q4)*q4diff*s
in(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*cos(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-cos(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-sin(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*sin(q1)+cos(q1))-
a2*cos(q2)*(d3*cos(q1)*q1diff-sin(q1)*q1diff);
```

a13diff=

```
d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff)*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1di
ff*cos(q2)+cos(q1)*sin(q2)*q2diff)+sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1
)*cos(q2))+cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*cos(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-cos(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-sin(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-d3*cos(q1)*q1diff*a2*cos(q2)+d3*sin(q1)*a2*sin(q2)*q2diff;
```

a14diff=

```
-d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
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```
sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff)*sin(q3)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*cos(q3)*q3diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
d6*(sin(q5)*sin(q3)*cos(q4)-sin(q5)*sin(q4)+cos(q3)*cos(q5))*sin(q3)*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-(-
sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*cos(q5)*
q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q4)*q4diff*sin(q5)*d6(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+sin(q4)*cos(q5)*q5diff*d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q1)*sin(q2))*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff)-
cos(q3)*q3diff*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*sin(q5)*q5diff*d6*(cos(q
1)*sin(q2)+sin(q1)*cos(q2))-sin(q3)*cos(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-a2*sin(q2)*q2diff*(d3*sin(q1)-
sin(q1))+a2*cos(q2)*(d3*cos(q1)*q1diff-cos(q1)*q1diff)-
d3*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1diff*cos(q2)+cos(q1)*sin(q2)*q2d
iff))*cos(q3)+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q4)*sin(q5)*
d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q3)*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+a2*cos(q2)*(d3*sin(q1)-sin(q1))-
d3*(sin(q1)*sin(q2)-cos(q1)*cos(q2)))*sin(q3)*q3diff;
```

a15diff =

```
d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff)*(-
cos(q3)*sin(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q4)*(cos(q1)*cos(q2)-
sin(q1)*sin(q2)))+d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*(sin(q3)*q3diff*sin(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*cos(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-cos(q3)*sin(q4)*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-sin(q4)*q4diff*(cos(q1)*cos(q2)-sin(q1)*sin(q2))+cos(q4)*(-
sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff))+(-
sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*cos(q5)*
q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q4)*q4diff*sin(q5)*d6(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+sin(q4)*cos(q5)*q5diff*d6(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+sin(q4)*sin(q5)*D(d6)(cos(q1)*cos(q2)-sin(q1)*sin(q2))*(-
sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff)-
cos(q3)*q3diff*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*sin(q5)*q5diff*d6*(cos(q
1)*sin(q2)+sin(q1)*cos(q2))-sin(q3)*cos(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-a2*sin(q2)*q2diff*(d3*sin(q1)-
sin(q1))+a2*cos(q2)*(d3*cos(q1)*q1diff-cos(q1)*q1diff)-
d3*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1diff*cos(q2)+cos(q1)*sin(q2)*q2d
iff))*(sin(q3)*sin(q4)+cos(q4))+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2)
)+sin(q4)*sin(q5)*d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q3)*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+a2*cos(q2)*(d3*sin(q1)-sin(q1))-
d3*(sin(q1)*sin(q2)-cos(q1)*cos(q2)))*(cos(q3)*q3diff*sin(q4)+sin(q3)*cos(q4)*q4diff-
sin(q4)*q4diff);
```

a16diff =

```
d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
sin(q3)*q3diff*cos(q5)-
cos(q3)*sin(q5)*q5diff)*(sin(q5)*cos(q3)*cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q5)*s
in(q4)*(cos(q1)*cos(q2)-sin(q1)*cos(q2))-
sin(q3)*cos(q5)*(cos(q1)*sin(q2)+sin(q1)*cos(q2)))+d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*(cos(q5)*q5diff*cos(q3)*cos(q4)*(cos(q1)*sin(q2)+sin(q1)*co
s(q2))-sin(q5)*sin(q3)*q3diff*cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q5)*cos(q3)*sin(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q5)*cos(q3)*cos(q4)*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q5)*q5diff*sin(q4)*(cos(q1)*cos(q2)-
sin(q1)*cos(q2))+sin(q5)*cos(q4)*q4diff*(cos(q1)*cos(q2)-sin(q1)*cos(q2))+sin(q5)*sin(q4)*(-
```

```
sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*cos(q2)+sin(q1)*sin(q2)*q2diff)-
cos(q3)*q3diff*cos(q5)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*sin(q5)*q5diff*(cos(q1)*sin
(q2)+sin(q1)*cos(q2))-sin(q3)*cos(q5)*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff))-cos(q5)*q5diff*sin(q3)*cos(q4)-
sin(q5)*cos(q3)*q3diff*cos(q4)+sin(q5)*sin(q3)*sin(q4)*q4diff+cos(q5)*q5diff*sin(q4)+sin(q5)
*cos(q4)*q4diff+sin(q3)*q3diff*cos(q5)+cos(q3)*sin(q5)*q5diff;

a21diff =
-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1(t))*cos(q2)-sin(q1)*sin(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1(t))*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1(t))*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1(t))*diff(q1(t),t)*cos(q2)-
cos(q1(t))*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-sin(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-a2*sin(q2)*q2diff*(d3*cos(q1)-sin(q1))+a2*cos(q2)*(-
d3*sin(q1)*q1diff-cos(q1)*q1diff)-a1*sin(q1)*q1diff%;

a22diff =
-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-sin(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-a2*sin(q2)*q2diff*(d3*cos(q1)-sin(q1))+a2*cos(q2)*(-
d3*sin(q1)*q1diff-cos(q1)*q1diff);

a23diff =
-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-sin(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-
d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
d6*(sin(q5)*sin(q3)*cos(q4)-sin(q5)*sin(q4)+cos(q3)*cos(q5))*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff);

a24diff =
(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*sin(q5)*D(d6)(cos(q1)*sin(q2)+sin(q1)*cos(q2))*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
```

```
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
d3*sin(q1)*q1diff+sin(q1)*q1diff))*cos(q3)-(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))-
sin(q4)*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+d3*cos(q1)*a2*cos(q2)-d3*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
a2*cos(q2)*(d3*cos(q1)-cos(q1)))*sin(q3)*q3diff-
d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff)*sin(q3)*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*cos(q3)*q3diff*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*sin(q3)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(
q1)*q1diff*cos(q2)+cos(q1)*sin(q2)*q2diff);
```

a25diff =

```
(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*sin(q5)*D(d6)(cos(q1)*sin(q2)+sin(q1)*cos(q2))*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
d3*sin(q1)*q1diff+sin(q1)*q1diff))*(-sin(q3)*sin(q4)-
cos(q4))+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q4)*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+d3*cos(q1)*a2*cos(q2)-d3*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
a2*cos(q2)*(d3*cos(q1)-cos(q1)))*(-cos(q3)*q3diff*sin(q4)-
sin(q3)*cos(q4)*q4diff+sin(q4)*q4diff)-
d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff)*(cos(q3)*sin(q4)*(sin(q1)*sin(q2)-
cos(q1)*sin(q2))-cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2)))-d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*(-sin(q3)*q3diff*sin(q4)*(sin(q1)*sin(q2)-
cos(q1)*sin(q2))+cos(q3)*cos(q4)*q4diff*(sin(q1)*sin(q2)-
cos(q1)*sin(q2))+cos(q3)*sin(q4)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1di
ff*sin(q2)-cos(q1)*cos(q2)*q2diff)+sin(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q4)*(-sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff));
```

a26diff =

```
(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*sin(q5)*D(d6)(cos(q1)*sin(q2)+sin(q1)*cos(q2))*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
```

```
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
d3*sin(q1)*q1diff+sin(q1)*q1diff))*cos(q3)-(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))-
sin(q4)*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+d3*cos(q1)*a2*cos(q2)-d3*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
a2*cos(q2)*(d3*cos(q1)-cos(q1)))*sin(q3)*q3diff-
d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff)*sin(q3)*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*cos(q3)*q3diff*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*sin(q3)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(
q1)*q1diff*cos(q2)+cos(q1)*sin(q2)*q2diff);
```

a25diff =

```
(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*sin(q5)*D(d6)(cos(q1)*sin(q2)+sin(q1)*cos(q2))*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
d3*sin(q1)*q1diff+sin(q1)*q1diff))*(-sin(q3)*sin(q4)-
cos(q4))+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q4)*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+d3*cos(q1)*a2*cos(q2)-d3*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
a2*cos(q2)*(d3*cos(q1)-cos(q1)))*(-cos(q3)*q3diff*sin(q4)-
sin(q3)*cos(q4)*q4diff+sin(q4)*q4diff)-
d6*(cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff)*(cos(q3)*sin(q4)*(sin(q1)*sin(q2)-
cos(q1)*sin(q2))-cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2)))-d6*(sin(q5)*sin(q3)*cos(q4)-
sin(q5)*sin(q4)+cos(q3)*cos(q5))*(-sin(q3)*q3diff*sin(q4)*(sin(q1)*sin(q2)-
cos(q1)*sin(q2))+cos(q3)*cos(q4)*q4diff*(sin(q1)*sin(q2)-
cos(q1)*sin(q2))+cos(q3)*sin(q4)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1di
ff*sin(q2)-cos(q1)*cos(q2)*q2diff)+sin(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q4)*(-sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff));
```

a26diff =

```
(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*sin(q5)*D(d6)(cos(q1)*sin(q2)+sin(q1)*cos(q2))*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
```

```
cos(q3)*q3diff*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*sin(q5)*q5diff*d6*(cos(q
1)*sin(q2)+sin(q1)*cos(q2))-sin(q3)*cos(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-a2*sin(q2)*q2diff*(d3*sin(q1)-
sin(q1))+a2*cos(q2)*(d3*cos(q1)*q1diff-cos(q1)*q1diff)-
d3*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1diff*cos(q2)+cos(q1)*sin(q2)*q2d
iff))*sin(q3)*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q4)*sin(q
5)*d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q3)*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+a2*cos(q2)*(d3*sin(q1)-sin(q1))-
d3*(sin(q1)*sin(q2)-cos(q1)*cos(q2)))*cos(q3)*q3diff*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q4)*sin(q
5)*d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q3)*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+a2*cos(q2)*(d3*sin(q1)-sin(q1))-
d3*(sin(q1)*sin(q2)-
cos(q1)*cos(q2)))*sin(q3)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1diff*cos(
q2)+cos(q1)*sin(q2)*q2diff)+(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))-cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*sin(q5)*D(d6)(cos(q1)*sin(q2)+sin(q1)*cos(q2))*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
d3*sin(q1)*q1diff+sin(q1)*q1diff))*sin(q3)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+(cos(q3)*cos(q4
)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q4)*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+d3*cos(q1)*a2*cos(q2)-d3*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
a2*cos(q2)*(d3*cos(q1)-
cos(q1)))*cos(q3)*q3diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(
q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q4)*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+d3*cos(q1)*a2*cos(q2)-d3*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
a2*cos(q2)*(d3*cos(q1)-cos(q1)))*sin(q3)*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff);

a35diff =
(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*cos(q5)*
q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q4)*q4diff*sin(q5)*d6(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+sin(q4)*cos(q5)*q5diff*d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))
-sin(q1)*sin(q2))*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff)-
cos(q3)*q3diff*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*sin(q5)*q5diff*d6*(cos(q
1)*sin(q2)+sin(q1)*cos(q2))-sin(q3)*cos(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-a2*sin(q2)*q2diff*(d3*sin(q1)-
sin(q1))+a2*cos(q2)*(d3*cos(q1)*q1diff-cos(q1)*q1diff)-
d3*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1diff*cos(q2)+cos(q1)*sin(q2)*q2d
iff))*(cos(q3)*sin(q4)*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2)))+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(
q1)*cos(q2))+sin(q4)*sin(q5)*d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q3)*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+a2*cos(q2)*(d3*sin(q1)-sin(q1))-
d3*(sin(q1)*sin(q2)-cos(q1)*cos(q2)))*(-sin(q3)*q3diff*sin(q4)*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+cos(q3)*cos(q4)*q4diff*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+cos(q3)*sin(q4)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1di
ff*cos(q2)+cos(q1)*sin(q2)*q2diff)+sin(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q4)*(-sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff))-(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))-cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
```

```
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))
+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
d3*sin(q1)*q1diff+sin(q1)*q1diff))*(cos(q3)*sin(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q4
)*(cos(q1)*cos(q2)-sin(q1)*sin(q2)))-(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))-
sin(q4)*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+d3*cos(q1)*a2*cos(q2)-d3*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
a2*cos(q2)*(d3*cos(q1)-cos(q1)))*(-
sin(q3)*q3diff*sin(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*q4diff*(cos(q1)*sin
(q2)+sin(q1)*cos(q2))+cos(q3)*sin(q4)*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-sin(q4)*q4diff*(cos(q1)*cos(q2)-sin(q1)*sin(q2))+cos(q4)*(-
sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff));

a36diff =
(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*cos(q5)*
q5diff*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q4)*q4diff*sin(q5)*d6(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+sin(q4)*cos(q5)*q5diff*d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))
-sin(q1)*sin(q2))*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff)-
cos(q3)*q3diff*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*sin(q5)*q5diff*d6*(cos(q
1)*sin(q2)+sin(q1)*cos(q2))-sin(q3)*cos(q5)*d6*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)-a2*sin(q2)*q2diff*(d3*sin(q1)-
sin(q1))+a2*cos(q2)*(d3*cos(q1)*q1diff-cos(q1)*q1diff)-
d3*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1diff*cos(q2)+cos(q1)*sin(q2)*q2d
iff))*(sin(q5)*cos(q3)*cos(q4)*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q5)*sin(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*(sin(q1)*sin(q2)-
cos(q1)*cos(q2)))+(cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q4)*sin(
q5)*d6(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q3)*cos(q5)*d6*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+a2*cos(q2)*(d3*sin(q1)-sin(q1))-
d3*(sin(q1)*sin(q2)-cos(q1)*cos(q2)))*(cos(q5)*q5diff*cos(q3)*cos(q4)*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))-sin(q5)*sin(q3)*q3diff*cos(q4)*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
sin(q5)*cos(q3)*sin(q4)*q4diff*(cos(q1)*cos(q2)-sin(q1)*sin(q2))+sin(q5)*cos(q3)*cos(q4)*(-
sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
sin(q1)*cos(q2)*q2diff)-cos(q5)*q5diff*sin(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q5)*cos(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-sin(q5)*sin(q4)*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1di
ff*cos(q2)+cos(q1)*sin(q2)*q2diff))-(-sin(q3)*q3diff*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))-cos(q3)*sin(q4)*q4diff*sin(q5)*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*cos(q5)*q5diff*d6*(cos(q1)*cos(q2)-
sin(q1)*sin(q2))+cos(q3)*cos(q4)*sin(q5)*d6*(-sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-
cos(q1)*q1diff*sin(q2)-sin(q1)*cos(q2)*q2diff)-
cos(q4)*q4diff*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
sin(q4)*cos(q5)*q5diff*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q1)*cos(q2))*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*d6*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
sin(q3)*sin(q5)*q5diff*d6*(sin(q1)*sin(q2)-
cos(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q
1diff*cos(q2)+cos(q1)*sin(q2)*q2diff)-d3*sin(q1)*q1diff*a2*cos(q2)-
d3*cos(q1)*a2*sin(q2)*q2diff-d3*(-
sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
sin(q1)*sin(q2)*q2diff)+a2*sin(q2)*q2diff*(d3*cos(q1)-cos(q1))-a2*cos(q2)*(-
```

```
        d3*sin(q1)*q1diff+sin(q1)*q1diff))*(sin(q5)*cos(q3)*cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2)
        )+sin(q5)*sin(q4)*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
        sin(q3)*cos(q5)*(cos(q1)*sin(q2)+sin(q1)*cos(q2)))-
        (cos(q3)*cos(q4)*sin(q5)*d6*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
        sin(q4)*sin(q5)*d6(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*cos(q5)*d6*(sin(q1)*sin(q2)-
        cos(q1)*cos(q2))+d3*cos(q1)*a2*cos(q2)-d3*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
        a2*cos(q2)*(d3*cos(q1)-
        cos(q1)))*(cos(q5)*q5diff*cos(q3)*cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
        sin(q5)*sin(q3)*q3diff*cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
        sin(q5)*cos(q3)*sin(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q5)*cos(q3)*cos(q4)*(-
        sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff)+cos(q5)*q5diff*sin(q4)*(cos(q1)*cos(q2)-
        sin(q1)*sin(q2))+sin(q5)*cos(q4)*q4diff*(cos(q1)*cos(q2)-sin(q1)*sin(q2))+sin(q5)*sin(q4)*(-
        sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
        sin(q1)*cos(q2)*q2diff)-
        cos(q3)*q3diff*cos(q5)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*sin(q5)*q5diff*(cos(q1)*sin
        (q2)+sin(q1)*cos(q2))-sin(q3)*cos(q5)*(-
        sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff));

a43diff =
        -sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff;

a44diff =
        cos(q3)*q3diff*(sin(q1)*sin(q2)-
        cos(q1)*cos(q2))+sin(q3)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1diff*cos(q
        2)+cos(q1)*sin(q2)*q2diff);

a45diff =
        -sin(q3)*q3diff*sin(q4)*(sin(q1)*sin(q2)-
        cos(q1)*cos(q2))+cos(q3)*cos(q4)*q4diff*(sin(q1)*sin(q2)-
        cos(q1)*cos(q2))+cos(q3)*sin(q4)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1di
        ff*cos(q2)+cos(q1)*sin(q2)*q2diff)+sin(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
        cos(q4)*(-sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff);

a46diff =
        cos(q5)*q5diff*cos(q3)*cos(q4)*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
        sin(q5)*sin(q3)*q3diff*cos(q4)*(cos(q1)*cos(q2)-sin(q1)*sin(q2))-
        sin(q5)*cos(q3)*sin(q4)*q4diff*(cos(q1)*cos(q2)-sin(q1)*sin(q2))+sin(q5)*cos(q3)*cos(q4)*(-
        sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
        sin(q1)*cos(q2)*q2diff)-cos(q5)*q5diff*sin(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
        sin(q5)*cos(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-sin(q5)*sin(q4)*(-
        sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff)+cos(q3)*q3diff*cos(q5)*(sin(q1)*sin(q2)-cos(q1)*cos(q2))-
        sin(q3)*sin(q5)*q5diff*(sin(q1)*sin(q2)-
        cos(q1)*cos(q2))+sin(q3)*cos(q5)*(cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1di
        ff*cos(q2)+cos(q1)*sin(q2)*q2diff)%1:=cos(q1)*cos(q2)%2:=sin(q1)*sin(q2);

a53diff =
        cos(q1)*q1diff*sin(q2)+sin(q1)*cos(q2)*q2diff+sin(q1)*q1diff*cos(q2)+cos(q1)*sin(q2)*q2diff;

a54diff =
        -cos(q3)*q3diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-sin(q3)*(-
        sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff);

a55diff =
        sin(q3)*q3diff*sin(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
        cos(q3)*cos(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-cos(q3)*sin(q4)*(-
        sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff)-sin(q4)*q4diff*(cos(q1)*cos(q2)-sin(q1)*sin(q2))+cos(q4)*(-
        sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
        sin(q1)*cos(q2)*q2diff);

a56diff =
```

```
        cos(q5)*q5diff*cos(q3)*cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
        sin(q5)*sin(q3)*q3diff*cos(q4)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))-
        sin(q5)*cos(q3)*sin(q4)*q4diff*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q5)*cos(q3)*cos(q4)*(-
        sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff)+cos(q5)*q5diff*sin(q4)*(cos(q1)*cos(q2)-
        sin(q1)*sin(q2))+sin(q5)*cos(q4)*q4diff*(cos(q1)*cos(q2)-sin(q1)*sin(q2))+sin(q5)*sin(q4)*(-
        sin(q1)*q1diff*cos(q2)-cos(q1)*sin(q2)*q2diff-cos(q1)*q1diff*sin(q2)-
        sin(q1)*cos(q2)*q2diff)-
        cos(q3)*q3diff*cos(q5)*(cos(q1)*sin(q2)+sin(q1)*cos(q2))+sin(q3)*sin(q5)*q5diff*(cos(q1)*sin
        (q2)+sin(q1)*cos(q2))-sin(q3)*cos(q5)*(-
        sin(q1)*q1diff*sin(q2)+cos(q1)*cos(q2)*q2diff+cos(q1)*q1diff*cos(q2)-
        sin(q1)*sin(q2)*q2diff)%1:=cos(q1)*sin(q2)+sin(q1)*cos(q2);

a64diff=
        -sin(q3)*q3diff;

a65diff=
        -cos(q3)*q3diff*sin(q4)-sin(q3)*cos(q4)*q4diff+sin(q4)*q4diff;

a66diff=
        cos(q5)*q5diff*sin(q3)*cos(q4)+sin(q5)*cos(q3)*q3diff*cos(q4)-
        sin(q5)*sin(q3)*sin(q4)*q4diff-cos(q5)*q5diff*sin(q4)-sin(q5)*cos(q4)*q4diff-
        sin(q3)*q3diff*cos(q5)-cos(q3)*sin(q5)*q5diff;
```

INVERSE JACOBIAN MATRIX :

J(^-1) = [inv11, inv12, inv13, inv14, inv15, inv16]

[inv21, inv22, inv23, inv24, inv25, inv26]

[inv31, inv32, inv33, inv34, inv35, inv36]

[inv41, inv42, inv43, inv44, inv45, inv46]

[inv51, inv52, inv53, inv54, inv55, inv56]

[inv61, inv62, inv63, inv64, inv65, inv66]

inv11 =

(a55*a43*a34*a66*a22-a54*a45*a36*a22+a54*a45*a23*a36-
a55*a64*a22*a43*a36+a54*a43*a35*a26-a55*a43*a34*a26-
a55*a34*a22*a46+a55*a23*a34*a46+a55*a24*a43*a36+a53*a34*a45*a26-
a53*a34*a45*a66*a22-a54*a43*a35*a66*a22-
a25*a53*a34*a46+a25*a43*a34*a56+a65*a22*a54*a43*a36+a53*a35*a24*a46-
a53*a35*a64*a22*a46-a25*a54*a43*a36+a35*a22*a54*a46+a64*a22*a43*a35*a56-
a24*a43*a35*a56-a24*a45*a53*a36+a34*a22*a45*a56+a65*a22*a53*a34*a46-
a65*a22*a43*a34*a56+a64*a22*a45*a53*a36+a44*a55*a36*a22-a44*a35*a22*a56-
a44*a53*a35*a26-a23*a34*a45*a56-a23*a35*a54*a46+a44*a53*a35*a66*a22-
a44*a55*a23*a36+a44*a25*a53*a36-
a44*a65*a22*a53*a36+a44*a23*a35*a56+a33*a44*a55*a26-a33*a44*a55*a66*a22-
a33*a44*a25*a56+a33*a44*a65*a22*a56-a33*a64*a22*a45*a56-
a33*a54*a45*a26+a33*a24*a45*a56-
a33*a55*a24*a46+a33*a54*a45*a66*a22+a33*a55*a64*a22*a46-
a33*a65*a22*a54*a46+a33*a25*a54*a46)/ (%1) ;

inv12 =

-(a33*a44*a12*a65*a56+a55*a43*a34*a12*a66-
a54*a45*a12*a36+a54*a45*a13*a36+a55*a14*a43*a36-a55*a43*a34*a16-
a55*a12*a34*a46+a55*a13*a34*a46+a54*a43*a35*a16-
a54*a43*a35*a12*a66+a53*a34*a45*a16-a53*a34*a45*a12*a66-a55*a12*a64*a43*a36-
a15*a53*a34*a46+a15*a43*a34*a56-a14*a45*a53*a36+a12*a64*a45*a53*a36-
a53*a35*a12*a64*a46+a53*a35*a14*a46-a15*a54*a43*a36+a12*a65*a53*a34*a46-
a12*a65*a43*a34*a56+a12*a35*a54*a46-a13*a34*a45*a56-
a14*a43*a35*a56+a12*a34*a45*a56+a12*a65*a54*a43*a36-
a44*a55*a13*a36+a12*a64*a43*a35*a56-a13*a35*a54*a46+a44*a55*a12*a36-
a44*a53*a35*a16-a44*a12*a35*a56-
a44*a12*a65*a53*a36+a44*a15*a53*a36+a44*a53*a35*a12*a66+a44*a13*a35*a56-
a33*a44*a55*a12*a66+a33*a44*a55*a16-a33*a44*a15*a56-a33*a54*a45*a16-
a33*a55*a14*a46+a33*a15*a54*a46+a33*a54*a45*a12*a66-
a33*a12*a65*a54*a46+a33*a14*a45*a56+a33*a55*a12*a64*a46-a33*a12*a64*a45*a56)/ (%1)

```
inv13=
  (a54*a26*a12*a65*a43+a54*a15*a46*a23+a54*a65*a22*a46*a13-
  a54*a26*a15*a43+a54*a16*a25*a43-a54*a12*a65*a46*a23+a54*a66*a22*a15*a43-
  a54*a12*a66*a25*a43+a54*a25*a46*a12+a44*a55*a66*a22*a13-a44*a55*a26*a13
  -a55*a24*a46*a12+a24*a56*a15*a43-a55*a14*a46*a23-a44*a15*a56*a23-a54*a15*a46*a22
  -a26*a44*a12*a65*a53-a15*a46*a24*a53+a44*a55*a26*a12-a14*a56*a25*a43-a16*a44*a25*a53
  -a54*a25*a46*a13-a44*a65*a22*a56*a13+a44*a25*a56*a13-a44*a25*a56*a12
  -a65*a22*a46*a14*a53-a55*a64*a22*a46*a13+a55*a24*a46*a13+a26*a44*a15*a53
  -a64*a22*a56*a15*a43+a25*a46*a14*a53-
   a66*a22*a55*a14*a43+a55*a14*a46*a22+a16*a44*a65*a22*a53-
   a66*a22*a44*a15*a53+a12*a64*a56*a25*a43+a12*a65*a46*a24*a53-a16*a44*a22*a55
  -a26*a55*a12*a64*a43+a26*a55*a14*a43+a16*a44*a55*a23-a16*a55*a24*a43
  -a24*a56*a12*a65*a43-a12*a66*a44*a55*a23+a14*a56*a65*a22*a43
  -a45*a54*a26*a12+a45*a54*a16*a22-
  a45*a12*a64*a56*a23+a45*a16*a24*a53+a45*a66*a22*a14*a53-
  a45*a54*a66*a22*a13+a45*a64*a22*a56*a13+a45*a24*a56*a12-a45*a12*a66*a24*a53
 -a45*a14*a56*a22+a45*a14*a56*a23-a45*a24*a56*a13+a45*a54*a12*a66*a23+a45*a54*a26*a13-
  a45*a54*a16*a23-a45*a16*a64*a22*a53+a45*a26*a12*a64*a53-a45*a26*a14*a53-
a54*a16*a65*a22*a43+a55*a12*a64*a46*a23+a12*a66*a44*a25*a53+a16*a55*a64*a22*a43+a44*a15*
a56*a22-a25*a46*a12*a64*a53+a15*a46*a64*a22*a53+a12*a66*a55*a24*a43+a44*a12*a65*a56*a23)/
(%1) ;

inv14=
        -(a26*a55*a12*a34+a64*a22*a56*a13*a35-a26*a55*a13*a34-a13*a34*a56*a65*a22-
        a16*a55*a34*a22+a34*a22*a56*a15-a24*a53*a36*a15-
        a54*a36*a22*a15+a54*a23*a36*a15+a54*a12*a36*a25+a54*a26*a13*a35+a54*a12*a66*a23*a
        35+a54*a16*a35*a22+a54*a13*a36*a65*a22-a54*a23*a36*a12*a65-a54*a16*a23*a35-
        a54*a26*a12*a35-a54*a13*a36*a25-a54*a66*a22*a13*a35-a24*a56*a13*a35-
        a12*a34*a56*a25-a13*a36*a55*a64*a22+a13*a36*a55*a24+a66*a22*a55*a13*a34-
        a14*a56*a35*a22+a24*a56*a12*a35-a16*a53*a35*a64*a22+a16*a65*a22*a53*a34-
        a12*a64*a56*a23*a35+a66*a22*a53*a35*a14+a64*a22*a53*a36*a15-
        a16*a25*a53*a34+a16*a53*a35*a24-a12*a36*a55*a24+a14*a53*a36*a25-
        a14*a53*a36*a65*a22-a12*a64*a53*a36*a25+a13*a34*a56*a25+a24*a53*a36*a12*a65-
        a12*a66*a55*a23*a34-a23*a36*a55*a14-a53*a34*a66*a22*a15-
        a53*a34*a26*a12*a65+a26*a53*a35*a12*a64+a23*a36*a55*a12*a64-
        a12*a66*a53*a35*a24+a53*a34*a26*a15-
        a23*a34*a56*a15+a23*a34*a56*a12*a65+a16*a55*a23*a34+a53*a34*a12*a66*a25+a36*a22*a
        55*a14-a26*a53*a35*a14+a14*a56*a23*a35+a33*a16*a55*a64*a22+a33*a12*a64*a56*a25-
        a33*a16*a55*a24-
        a33*a14*a56*a25+a33*a14*a56*a65*a22+a33*a12*a66*a55*a24+a33*a26*a55*a14-
        a33*a24*a56*a12*a65-a33*a66*a22*a55*a14+a33*a54*a66*a22*a15-
        a33*a54*a12*a66*a25+a33*a54*a26*a12*a65-a33*a54*a16*a65*a22+a33*a24*a56*a15-
        a33*a64*a22*a56*a15-a33*a26*a55*a12*a64-a33*a54*a26*a15+a33*a54*a16*a25)/ (%1) ;

inv15=
        (-a33*a45*a66*a22*a14-
        a33*a45*a26*a12*a64+a12*a65*a46*a23*a34+a12*a35*a46*a24+a43*a35*a26*a12*a64-
        a23*a35*a46*a12*a64-a25*a46*a12*a34+a15*a43*a36*a64*a22-a26*a44*a12*a35-
        a26*a43*a34*a12*a65-a16*a64*a22*a43*a35+a45*a16*a23*a34-a45*a12*a36*a24-
        a45*a23*a36*a14-a45*a13*a36*a64*a22+a45*a23*a36*a12*a64+a45*a13*a36*a24-
        a45*a16*a34*a22+a45*a66*a22*a13*a34-a45*a12*a66*a23*a34-
        a45*a26*a13*a34+a45*a26*a12*a34+a45*a36*a22*a14+a33*a45*a12*a66*a24+a33*a45*a16*a
        64*a22+a33*a16*a44*a25-a33*a26*a44*a15+a33*a66*a22*a44*a15+a33*a25*a46*a12*a64-
        a33*a25*a46*a14-a33*a12*a65*a46*a24+a33*a65*a22*a46*a14+a33*a26*a44*a12*a65-
        a33*a12*a66*a44*a25+a33*a15*a46*a24-a33*a16*a44*a65*a22-a33*a15*a46*a64*a22-
        a16*a44*a23*a35+a26*a43*a34*a15-a25*a43*a36*a12*a64+a25*a46*a13*a34-
```

```
a66*a22*a43*a34*a15-a65*a22*a46*a13*a34-
a66*a22*a44*a13*a35+a23*a35*a46*a14+a26*a44*a13*a35-a15*a43*a36*a24-
a13*a36*a44*a25+a25*a43*a36*a14+a13*a36*a44*a65*a22+a12*a36*a44*a25+a43*a35*a66*a
22*a14-a36*a22*a44*a15-
a43*a35*a12*a66*a24+a13*a35*a46*a64*a22+a16*a43*a34*a65*a22-
a23*a36*a44*a12*a65+a23*a36*a44*a15-a16*a43*a34*a25-
a65*a22*a43*a36*a14+a16*a44*a35*a22-
a35*a22*a46*a14+a12*a65*a43*a36*a24+a12*a66*a43*a34*a25+a15*a46*a34*a22+a16*a24*a
43*a35-a43*a35*a26*a14-a15*a46*a23*a34-a13*a35*a46*a24+a12*a66*a44*a23*a35-
a33*a45*a16*a24+a33*a45*a26*a14)/ (%1);

inv16=
-(a33*a44*a22*a15*a56+a33*a44*a55*a12*a26-a54*a45*a22*a13*a36+a54*a45*a12*a23*a36-
a55*a43*a34*a12*a26+a55*a12*a23*a34*a46+a55*a12*a24*a43*a36+a55*a43*a34*a22*a16-
a55*a13*a34*a22*a46-a55*a14*a43*a22*a36-a53*a34*a45*a22*a16+a53*a34*a45*a12*a26-
a54*a43*a35*a22*a16+a54*a43*a35*a12*a26+a14*a43*a22*a35*a56+a13*a34*a22*a45*a56-
a43*a34*a22*a15*a56-a53*a35*a14*a22*a46+a53*a35*a12*a24*a46+a14*a22*a45*a53*a36-
a12*a24*a45*a53*a36-a12*a23*a35*a54*a46-a12*a25*a54*a43*a36-
a12*a25*a53*a34*a46+a43*a34*a12*a25*a56+a22*a13*a35*a54*a46+a44*a55*a22*a13*a36-
a12*a24*a43*a35*a56-a12*a23*a34*a45*a56+a22*a15*a54*a43*a36+a22*a15*a53*a34*a46-
a44*a55*a12*a23*a36-a44*a53*a35*a12*a26+a44*a12*a25*a53*a36+a44*a12*a23*a35*a56-
a44*a22*a13*a35*a56+a44*a53*a35*a22*a16-a44*a22*a15*a53*a36-a33*a44*a12*a25*a56-
a33*a44*a55*a22*a16+a33*a12*a25*a54*a46-
a33*a54*a45*a12*a26+a33*a54*a45*a22*a16+a33*a55*a14*a22*a46-a33*a55*a12*a24*a46-
a33*a22*a15*a54*a46-a33*a14*a22*a45*a56+a33*a12*a24*a45*a56)/ (%1) ;

inv21=
-(a54*a45*a23*a36+a54*a43*a35*a26-
a55*a43*a34*a26+a55*a23*a34*a46+a55*a24*a43*a36+a53*a34*a45*a26-
a25*a53*a34*a46+a25*a43*a34*a56+a53*a35*a24*a46-a25*a54*a43*a36-a24*a43*a35*a56-
a24*a45*a53*a36-a44*a53*a35*a26-a23*a34*a45*a56-a23*a35*a54*a46-
a44*a55*a23*a36+a44*a25*a53*a36+a44*a23*a35*a56+a33*a44*a55*a26-a33*a44*a25*a56-
a33*a54*a45*a26+a33*a24*a45*a56-
a33*a55*a24*a46+a33*a25*a54*a46+a21*a33*a44*a65*a56-a21*a33*a44*a55*a66-
a21*a33*a65*a54*a46-a21*a33*a64*a45*a56+a21*a33*a55*a64*a46+a21*a33*a54*a45*a66-
a21*a44*a35*a56+a21*a44*a53*a35*a66-a21*a44*a65*a53*a36+a21*a44*a55*a36-
a21*a54*a43*a35*a66-a21*a53*a34*a45*a66+a21*a34*a45*a56-
a21*a53*a35*a64*a46+a21*a64*a45*a53*a36-
a21*a65*a43*a34*a56+a21*a64*a43*a35*a56+a21*a65*a54*a43*a36+a21*a65*a53*a34*a46-
a21*a54*a45*a36+a21*a35*a54*a46+a21*a55*a43*a34*a66-a21*a55*a34*a46-
a21*a55*a64*a43*a36)/ (%1) ;

inv22=
(a54*a45*a13*a36+a55*a14*a43*a36-
a55*a43*a34*a16+a55*a13*a34*a46+a54*a43*a35*a16+a53*a34*a45*a16-
a15*a53*a34*a46+a15*a43*a34*a56-a14*a45*a53*a36+a53*a35*a14*a46-a15*a54*a43*a36-
a13*a34*a45*a56-a14*a43*a35*a56-a44*a55*a13*a36-a13*a35*a54*a46-
a44*a53*a35*a16+a44*a15*a53*a36+a44*a13*a35*a56+a33*a44*a55*a16-a33*a44*a15*a56-
a33*a54*a45*a16-
a33*a55*a14*a46+a33*a15*a54*a46+a33*a14*a45*a56+a65*a46*a53*a34*a11-
a44*a35*a56*a11-a55*a64*a43*a36*a11+a44*a55*a36*a11-a53*a35*a64*a46*a11-
a44*a65*a53*a36*a11-
a65*a43*a34*a56*a11+a64*a56*a43*a35*a11+a66*a55*a43*a34*a11+a66*a44*a53*a35*a11+a
54*a35*a46*a11+a54*a65*a43*a36*a11-a54*a66*a43*a35*a11-
a45*a54*a36*a11+a45*a34*a56*a11+a45*a64*a53*a36*a11-
a45*a66*a53*a34*a11+a33*a45*a54*a66*a11-a33*a45*a64*a56*a11-
```

```
a33*a54*a65*a46*a11+a33*a44*a65*a56*a11-a33*a44*a55*a66*a11+a33*a55*a64*a46*a11-
a55*a34*a46*a11)/ (%1);

inv23=
-(a54*a15*a46*a23-a54*a26*a15*a43+a54*a16*a25*a43-a44*a55*a26*a13+a24*a56*a15*a43-
a55*a14*a46*a23-a44*a15*a56*a23-a15*a46*a24*a53-a14*a56*a25*a43-a16*a44*a25*a53-
a54*a25*a46*a13+a44*a25*a56*a13+a55*a24*a46*a13+a26*a44*a15*a53+a25*a46*a14*a53+
a26*a55*a14*a43+a16*a44*a55*a23-a16*a55*a24*a43+a45*a16*a24*a53+a45*a14*a56*a23-
a45*a24*a56*a13+a45*a54*a26*a13-a45*a54*a16*a23-a45*a26*a14*a53-
a66*a44*a55*a11*a23+a44*a55*a11*a26+a55*a64*a46*a11*a23-
a55*a11*a24*a46+a66*a55*a11*a24*a43+a44*a65*a56*a11*a23-a11*a26*a55*a64*a43-
a11*a26*a44*a65*a53-a11*a24*a56*a65*a43+a64*a56*a11*a25*a43-
a11*a25*a46*a64*a53+a65*a46*a11*a24*a53-a44*a11*a25*a56-
a45*a54*a11*a26+a45*a11*a26*a64*a53-a45*a66*a11*a24*a53+a45*a11*a24*a56-
a45*a64*a56*a11*a23+a45*a54*a66*a11*a23+a54*a11*a25*a46+a54*a11*a26*a65*a43-
a54*a66*a11*a25*a43-a54*a65*a46*a11*a23+a66*a44*a11*a25*a53+a21*a45*a66*a14*a53-
a21*a45*a16*a64*a53-
a21*a45*a14*a56+a21*a45*a64*a56*a13+a21*a54*a66*a15*a43+a21*a54*a65*a46*a13-
a21*a54*a16*a65*a43-a21*a54*a15*a46+a21*a16*a55*a64*a43-a21*a55*a64*a46*a13-
a21*a66*a44*a15*a53-a21*a66*a55*a14*a43+a21*a14*a56*a65*a43+a21*a15*a46*a64*a53-
a21*a65*a46*a14*a53+a21*a44*a55*a66*a13+a21*a16*a44*a65*a53-a21*a44*a65*a56*a13-
a21*a64*a56*a15*a43+a21*a55*a14*a46-a21*a16*a44*a55+a21*a44*a15*a56-
a21*a45*a54*a66*a13+a21*a45*a54*a16)/ (%1) ;

inv24=
(-a26*a55*a13*a34-a24*a53*a36*a15+a54*a23*a36*a15+a54*a26*a13*a35-a54*a16*a23*a35-
a54*a13*a36*a25-a24*a56*a13*a35+a13*a36*a55*a24-
a16*a25*a53*a34+a16*a53*a35*a24+a14*a53*a36*a25+a13*a34*a56*a25-
a23*a36*a55*a14+a53*a34*a26*a15-a23*a34*a56*a15+a16*a55*a23*a34-
a26*a53*a35*a14+a14*a56*a23*a35-a33*a16*a55*a24-
a33*a14*a56*a25+a33*a26*a55*a14+a33*a24*a56*a15-a33*a54*a26*a15+a33*a54*a16*a25-
a53*a34*a11*a26*a65+a11*a23*a36*a55*a64+a11*a26*a55*a34+a11*a24*a56*a35+a11*a26*a
53*a35*a64+a11*a23*a34*a56*a65+a11*a24*a53*a36*a65-
a66*a53*a35*a11*a24+a66*a11*a25*a53*a34-a34*a56*a11*a25-a64*a53*a36*a11*a25-
a36*a55*a11*a24-a64*a56*a11*a23*a35-a54*a11*a23*a36*a65+a54*a66*a11*a23*a35-
a66*a55*a11*a23*a34-a54*a11*a26*a35+a54*a36*a11*a25-
a33*a54*a66*a11*a25+a33*a54*a11*a26*a65+a33*a64*a56*a11*a25-a33*a11*a24*a56*a65-
a33*a11*a26*a55*a64+a33*a66*a55*a11*a24+a21*a33*a54*a66*a15+a21*a54*a16*a35-
a21*a33*a54*a16*a65-a21*a33*a66*a55*a14+a21*a33*a14*a56*a65-
a21*a33*a64*a56*a15+a21*a33*a16*a55*a64+a21*a54*a13*a36*a65-a21*a54*a36*a15-
a21*a54*a66*a13*a35-a21*a13*a34*a56*a65+a21*a16*a65*a53*a34-a21*a16*a55*a34-
a21*a16*a53*a35*a64-a21*a14*a56*a35-a21*a14*a53*a36*a65-
a21*a13*a36*a55*a64+a21*a64*a56*a13*a35+a21*a66*a55*a13*a34+a21*a66*a53*a35*a14+a
21*a34*a56*a15+a21*a64*a53*a36*a15-a21*a66*a15*a53*a34+a21*a36*a55*a14)/ (%1);

inv25=
-(a45*a16*a23*a34-a45*a23*a36*a14+a45*a13*a36*a24-
a45*a26*a13*a34+a65*a46*a11*a23*a34+a35*a46*a11*a24-
a11*a25*a43*a36*a64+a36*a44*a11*a25+a65*a43*a36*a11*a24-a11*a23*a35*a46*a64-
a66*a11*a24*a43*a35-a11*a26*a43*a34*a65-
a11*a25*a46*a34+a43*a35*a11*a26*a64+a66*a44*a11*a23*a35-a11*a26*a44*a35-
a11*a23*a36*a44*a65+a66*a43*a34*a11*a25-a33*a65*a46*a11*a24-a33*a45*a11*a26*a64-
a33*a66*a44*a11*a25+a33*a11*a26*a44*a65+a33*a11*a25*a46*a64+a33*a45*a66*a11*a24-
a45*a36*a11*a24+a45*a11*a23*a36*a64-
a45*a66*a11*a23*a34+a45*a11*a26*a34+a33*a16*a44*a25-a33*a26*a44*a15-
a33*a25*a46*a14+a33*a15*a46*a24-
```

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a16*a44*a23*a35+a26*a43*a34*a15+a25*a46*a13*a34+a23*a35*a46*a14+a26*a44*a13*a35-
a15*a43*a36*a24-a13*a36*a44*a25+a25*a43*a36*a14+a23*a36*a44*a15-
a16*a43*a34*a25+a16*a24*a43*a35-a43*a35*a26*a14-a15*a46*a23*a34-a13*a35*a46*a24-
a33*a45*a16*a24+a33*a45*a26*a14-
a21*a33*a45*a66*a14+a21*a33*a45*a16*a64+a21*a33*a66*a44*a15+a21*a33*a65*a46*a14-
a21*a33*a16*a44*a65-a21*a33*a15*a46*a64+a21*a45*a36*a14-
a21*a45*a13*a36*a64+a21*a45*a66*a13*a34-a21*a45*a16*a34+a21*a15*a43*a36*a64-
a21*a66*a43*a34*a15+a21*a66*a14*a43*a35+a21*a15*a46*a34+a21*a13*a35*a46*a64-
a21*a65*a46*a13*a34-a21*a66*a44*a13*a35+a21*a13*a36*a44*a65-a21*a36*a44*a15-
a21*a16*a64*a43*a35+a21*a16*a44*a35-a21*a65*a43*a36*a14-
a21*a35*a46*a14+a21*a16*a43*a34*a65)/ (%1);

inv26=
 (a21*a13*a34*a45*a56+a21*a33*a54*a45*a16+a54*a45*a11*a23*a36-
a55*a43*a34*a11*a26+a55*a11*a24*a43*a36+a55*a11*a23*a34*a46+a54*a43*a35*a11*a26+a
53*a34*a45*a11*a26+a53*a35*a11*a24*a46-a11*a23*a35*a54*a46-a11*a25*a54*a43*a36-
a11*a25*a53*a34*a46-a11*a24*a45*a53*a36-a11*a23*a34*a45*a56+a43*a34*a11*a25*a56-
a44*a55*a11*a23*a36-a11*a24*a43*a35*a56+a44*a11*a25*a53*a36+a44*a11*a23*a35*a56-
a44*a53*a35*a11*a26+a33*a44*a55*a11*a26-a33*a44*a11*a25*a56-
a33*a55*a11*a24*a46+a33*a11*a24*a45*a56-a33*a54*a45*a11*a26+a33*a11*a25*a54*a46-
a21*a54*a45*a13*a36-a21*a55*a14*a43*a36+a21*a55*a43*a34*a16-a21*a55*a13*a34*a46-
a21*a54*a43*a35*a16-a21*a53*a34*a45*a16+a21*a15*a53*a34*a46-
a21*a15*a43*a34*a56+a21*a14*a45*a53*a36-
a21*a53*a35*a14*a46+a21*a15*a54*a43*a36+a21*a14*a43*a35*a56+a21*a44*a55*a13*a36+a
21*a13*a35*a54*a46+a21*a44*a53*a35*a16-a21*a44*a15*a53*a36-a21*a44*a13*a35*a56-
a21*a33*a44*a55*a16+a21*a33*a44*a15*a56+a21*a33*a55*a14*a46-a21*a33*a15*a54*a46-
a21*a33*a14*a45*a56) / (%1);

inv31=
-(a21*a54*a45*a36-a21*a34*a45*a56-a21*a35*a54*a46-
a21*a44*a55*a36+a21*a55*a34*a46+a21*a44*a35*a56-
a54*a45*a36*a22+a34*a22*a45*a56+a35*a22*a54*a46-a55*a34*a22*a46+a44*a55*a36*a22-
a44*a35*a22*a56)/ (%1);
inv32=
(a45*a54*a36*a11-a54*a45*a12*a36+a12*a34*a45*a56-a45*a34*a56*a11+a12*a35*a54*a46-
a54*a35*a46*a11-a55*a12*a34*a46-a44*a55*a36*a11+a44*a55*a12*a36-
a44*a12*a35*a56+a55*a34*a46*a11+a44*a35*a56*a11)/ (%1);

inv33=
(-a54*a25*a46*a12+a55*a24*a46*a12+a54*a15*a46*a22-a44*a55*a26*a12+a44*a25*a56*a12-
a55*a14*a46*a22+a16*a44*a22*a55+a45*a54*a26*a12-a45*a54*a16*a22-
a45*a24*a56*a12+a45*a14*a56*a22+a44*a22*a11*a65*a56+a44*a55*a11*a26-
a55*a11*a24*a46-a44*a11*a25*a56-a45*a54*a11*a26+a45*a11*a24*a56+a54*a11*a25*a46-
a21*a45*a14*a56-a21*a54*a15*a46+a21*a55*a14*a46-
a21*a16*a44*a55+a21*a44*a15*a56+a21*a45*a54*a16-a44*a15*a56*a22-
a44*a55*a22*a11*a66+a55*a22*a11*a64*a46-a54*a22*a11*a65*a46+a45*a54*a22*a11*a66-
a45*a22*a11*a64*a56-a21*a45*a54*a12*a66+a21*a45*a12*a64*a56+a21*a54*a12*a65*a46-
a21*a55*a12*a64*a46-a21*a44*a12*a65*a56+a21*a44*a55*a12*a66)/ (%1);

inv34=
-(a36*a55*a22*a11*a64-a22*a11*a64*a56*a35-a22*a11*a66*a55*a34+a34*a56*a22*a11*a65-
a21*a54*a12*a66*a35+a54*a22*a11*a66*a35-a54*a36*a22*a11*a65+a21*a12*a66*a55*a34-
a21*a34*a56*a12*a65-a21*a36*a55*a12*a64+a21*a12*a64*a56*a35+a21*a54*a36*a12*a65-
a26*a55*a12*a34+a16*a55*a34*a22-a34*a22*a56*a15+a54*a36*a22*a15-a54*a12*a36*a25-
a54*a16*a35*a22+a54*a26*a12*a35+a12*a34*a56*a25+a14*a56*a35*a22-
a24*a56*a12*a35+a12*a36*a55*a24-a36*a22*a55*a14+a11*a26*a55*a34+a11*a24*a56*a35-
```

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        a34*a56*a11*a25-a36*a55*a11*a24-a54*a11*a26*a35+a54*a36*a11*a25+a21*a54*a16*a35-
        a21*a54*a36*a15-a21*a16*a55*a34-a21*a14*a56*a35+a21*a34*a56*a15+a21*a36*a55*a14)/
        (%1);

inv35=
        (a21*a35*a46*a12*a64+a21*a36*a44*a12*a65-a21*a45*a36*a12*a64-a21*a12*a65*a46*a34-
        a21*a12*a66*a44*a35-
        a12*a35*a46*a24+a25*a46*a12*a34+a26*a44*a12*a35+a45*a12*a36*a24+a45*a16*a34*a22-
        a45*a26*a12*a34-a45*a36*a22*a14+a21*a45*a12*a66*a34-
        a36*a44*a22*a11*a65+a22*a11*a65*a46*a34-
        a45*a22*a11*a66*a34+a35*a46*a11*a24+a36*a44*a11*a25-a11*a25*a46*a34-
        a11*a26*a44*a35-a45*a36*a11*a24+a45*a11*a26*a34-a12*a36*a44*a25+a36*a22*a44*a15-
        a16*a44*a35*a22+a35*a22*a46*a14-a15*a46*a34*a22-
        a35*a46*a22*a11*a64+a22*a11*a66*a44*a35+a21*a45*a36*a14-
        a21*a45*a16*a34+a21*a15*a46*a34-a21*a36*a44*a15+a21*a16*a44*a35-
        a21*a35*a46*a14+a45*a36*a22*a11*a64)/ (%1);

inv36=
  -(-a21*a54*a45*a12*a36+a21*a12*a34*a45*a56+a21*a12*a35*a54*a46+a21*a44*a55*a12*a36-
  a21*a44*a12*a35*a56-a21*a55*a12*a34*a46+a54*a45*a22*a11*a36-a22*a11*a34*a45*a56
 -a22*a11*a35*a54*a46-a44*a55*a22*a11*a36+a44*a22*a11*a35*a56+a55*a22*a11*a34*a46) /(%1);
inv41=
        -(a21*a33*a45*a56-a21*a33*a55*a46-a21*a45*a53*a36+a21*a53*a35*a46+a21*a55*a43*a36-
        a21*a43*a35*a56-a33*a45*a22*a56+a33*a55*a22*a46+a45*a53*a22*a36-a53*a35*a22*a46-
        a55*a43*a22*a36+a43*a35*a22*a56)/ (%1);

inv42=
        (-a33*a45*a56*a12+a33*a45*a56*a11+a33*a55*a46*a12-a33*a55*a46*a11-
        a45*a53*a36*a11+a45*a53*a36*a12+a56*a43*a35*a12-a56*a43*a35*a11+a53*a35*a46*a11-
        a53*a35*a46*a12+a55*a43*a36*a11-a55*a43*a36*a12)/ (%1);

inv43=
        -(-a55*a46*a11*a23+a56*a12*a25*a43-a55*a46*a22*a13-a56*a22*a15*a43+a11*a25*a46*a53-
        a12*a25*a46*a53+a16*a55*a43*a22+a55*a46*a12*a23-
        a22*a11*a65*a46*a53+a55*a46*a22*a11-a12*a26*a55*a43-
        a22*a11*a66*a55*a43+a22*a15*a46*a53+a56*a22*a11*a65*a43-
        a56*a11*a25*a43+a11*a26*a55*a43+a21*a45*a56*a12-
        a21*a45*a56*a13+a21*a12*a65*a46*a53-
        a45*a16*a53*a22+a45*a12*a26*a53+a45*a56*a11*a23+a45*a22*a11*a66*a53-
        a45*a56*a12*a23-a45*a11*a26*a53+a45*a56*a22*a13-a45*a56*a22*a11-
        a21*a45*a12*a66*a53+a21*a45*a16*a53+a21*a55*a46*a13-a21*a16*a55*a43-
        a21*a55*a46*a12+a21*a56*a15*a43-a21*a15*a46*a53-
        a21*a56*a12*a65*a43+a21*a12*a66*a55*a43)/ (%1);

inv44=
        -(-a33*a56*a12*a25-a33*a11*a26*a55-a33*a16*a22*a55+a33*a56*a22*a15-
        a33*a56*a22*a11*a65+a33*a56*a11*a25+a33*a22*a11*a66*a55+a33*a12*a26*a55+a11*a23*a
        36*a55-a12*a23*a36*a55-a53*a36*a11*a25+a56*a22*a11*a35-
        a53*a36*a22*a15+a53*a36*a22*a11*a65-a56*a11*a23*a35-a22*a11*a36*a55-
        a56*a22*a13*a35+a22*a13*a36*a55-a12*a26*a53*a35+a11*a26*a53*a35-
        a22*a11*a66*a53*a35+a56*a12*a23*a35+a16*a53*a22*a35+a53*a36*a12*a25-
        a21*a33*a56*a15+a21*a33*a16*a55+a21*a33*a56*a12*a65-a21*a33*a12*a66*a55-
        a21*a16*a53*a35+a21*a12*a36*a55-
        a21*a53*a36*a12*a65+a21*a12*a66*a53*a35+a21*a53*a36*a15-
        a21*a56*a12*a35+a21*a56*a13*a35-a21*a13*a36*a55)/ (%1);
```

```
inv45=
        (a35*a46*a22*a11+a21*a15*a43*a36-a43*a35*a22*a11*a66-a43*a35*a12*a26-
        a11*a23*a35*a46+a43*a35*a11*a26+a43*a35*a22*a16-a22*a13*a35*a46+a12*a23*a35*a46-
        a11*a25*a43*a36+a22*a11*a65*a43*a36-
        a22*a15*a43*a36+a12*a25*a43*a36+a45*a22*a13*a36-a45*a36*a22*a11-
        a45*a12*a23*a36+a45*a11*a23*a36-
        a21*a33*a45*a12*a66+a21*a33*a12*a65*a46+a21*a45*a36*a12-a21*a45*a13*a36-
        a21*a12*a65*a43*a36-a21*a43*a35*a16+a21*a13*a35*a46-
        a21*a35*a46*a12+a21*a43*a35*a12*a66+a21*a33*a45*a16-
        a21*a33*a15*a46+a33*a45*a12*a26-a33*a45*a22*a16+a33*a45*a22*a11*a66-
        a33*a45*a11*a26+a33*a22*a15*a46-a33*a12*a25*a46-
        a33*a22*a11*a65*a46+a33*a11*a25*a46)/ (%1);

inv46=
        -(-a21*a33*a45*a56*a12+a21*a33*a55*a46*a12+
        a21*a45*a53*a36*a12+a21*a56*a43*a35*a12-a21*a53*a35*a46*a12-
        a21*a55*a43*a36*a12+a33*a45*a56*a22*a11-a33*a55*a46*a22*a11-
        a53*a36*a22*a11*a45+a55*a43*a36*a22*a11+a53*a35*a46*a22*a11-a56*a43*a22*a35*a11)/
        (%1);


inv51=
        (-a21*a33*a54*a46+a21*a33*a44*a56+a21*a54*a43*a36-a21*a44*a53*a36-
        a21*a43*a34*a56+a21*a53*a34*a46+a33*a54*a22*a46-a33*a44*a22*a56-
        a54*a43*a22*a36+a43*a34*a22*a56-a53*a34*a22*a46+a44*a53*a22*a36)/ (%1);

inv52=
        -(a33*a54*a46*a12-a33*a54*a46*a11+a33*a44*a56*a11-a33*a44*a56*a12+a54*a43*a36*a11-
        a54*a43*a36*a12-a43*a34*a56*a11+a46*a53*a34*a11-a44*a53*a36*a11-
        a46*a53*a34*a12+a44*a53*a36*a12+a43*a34*a56*a12)/ (%1) ,

inv53=
        (-a21*a54*a16*a43+a21*a54*a12*a66*a43-a21*a54*a46*a12+a21*a54*a46*a13-
        a21*a12*a64*a56*a43-
        a21*a12*a66*a44*a53+a21*a44*a56*a12+a21*a16*a44*a53+a21*a46*a12*a64*a53+a21*a14*a
        56*a43-a21*a44*a56*a13-a21*a46*a14*a53-a54*a46*a11*a23-
        a54*a12*a26*a43+a54*a46*a22*a11-a54*a46*a22*a13-
        a14*a22*a56*a43+a12*a26*a44*a53+a12*a24*a56*a43+a22*a11*a66*a44*a53+a54*a46*a12*a
        23-a11*a24*a56*a43-a11*a26*a44*a53-a46*a22*a11*a64*a53+a44*a56*a11*a23-
        a44*a56*a12*a23+a44*a56*a22*a13+a46*a14*a22*a53-a44*a56*a22*a11-
        a46*a12*a24*a53+a46*a11*a24*a53-
        a16*a44*a53*a22+a22*a11*a64*a56*a43+a54*a11*a26*a43+a54*a16*a43*a22-
        a54*a22*a11*a66*a43/ (%1);

inv54=
        (a33*a14*a22*a56-a36*a22*a11*a54-a53*a34*a22*a11*a66+a21*a33*a16*a54-
        a21*a33*a54*a12*a66-a21*a33*a14*a56+a21*a33*a12*a64*a56+a21*a36*a12*a54-
        a21*a54*a13*a36+a21*a53*a34*a12*a66-a21*a34*a56*a12-
        a21*a16*a53*a34+a21*a13*a34*a56-
        a21*a12*a64*a53*a36+a21*a14*a53*a36+a33*a54*a12*a26-
        a33*a54*a22*a16+a33*a54*a22*a11*a66-a33*a11*a26*a54-
        a33*a22*a11*a64*a56+a33*a11*a24*a56-a33*a12*a24*a56-
        a11*a23*a34*a56+a12*a23*a34*a56-a14*a22*a53*a36+a12*a24*a53*a36-
        a13*a34*a22*a56+a22*a11*a64*a53*a36-a11*a24*a53*a36-
        a53*a34*a12*a26+a53*a34*a11*a26+a22*a11*a34*a56+a53*a34*a22*a16+a54*a22*a13*a36-
        a54*a12*a23*a36+a54*a11*a23*a36/ (%1);
```

```
inv55=
        -(-a21*a33*a12*a66*a44-a21*a33*a46*a14+a21*a33*a16*a44+a21*a33*a46*a12*a64-
        a21*a43*a36*a12*a64+a21*a46*a13*a34+a21*a43*a36*a14+a21*a12*a36*a44-
        a21*a13*a36*a44+a21*a12*a66*a43*a34-a21*a46*a12*a34-
        a21*a16*a43*a34+a33*a22*a11*a66*a44+a33*a12*a26*a44+a33*a46*a11*a24-
        a33*a46*a22*a11*a64-a33*a11*a26*a44-a33*a16*a22*a44+a33*a46*a14*a22-
        a33*a46*a12*a24+a43*a36*a22*a11*a64-a43*a36*a14*a22+a43*a36*a12*a24-
        a43*a36*a11*a24-a22*a11*a36*a44+a11*a26*a43*a34+a46*a12*a23*a34-a12*a23*a36*a44-
        a46*a13*a34*a22-a22*a11*a66*a43*a34+a11*a23*a36*a44-
        a46*a11*a23*a34+a16*a43*a22*a34+a22*a13*a36*a44+a46*a22*a11*a34-a12*a26*a43*a34/
        (%1);

inv56=
        (a21*a33*a54*a46*a12-a21*a33*a44*a56*a12-
        a21*a54*a43*a36*a12+a21*a44*a53*a36*a12+a21*a43*a34*a56*a12-a21*a46*a53*a34*a12-
        a33*a54*a46*a22*a11+a33*a44*a56*a22*a11+a43*a22*a36*a11*a54-a43*a34*a22*a56*a11-
        a44*a53*a22*a36*a11+a53*a34*a46*a22*a11) / (%1);


inv61=
        (a21*a33*a54*a45-a21*a33*a44*a55-a21*a54*a43*a35-
        a21*a53*a34*a45+a21*a44*a53*a35+a21*a43*a34*a55-
        a33*a54*a22*a45+a33*a44*a22*a55+a53*a34*a22*a45-a43*a34*a22*a55+a54*a43*a22*a35-
        a44*a53*a22*a35/ (%1);

inv62=
        -(a33*a44*a55*a12-a33*a44*a55*a11+a33*a54*a45*a11-a33*a54*a45*a12+a44*a53*a35*a11-
        a44*a53*a35*a12+a53*a34*a45*a12-a53*a34*a45*a11+a55*a43*a34*a11+a54*a43*a35*a12-
        a54*a43*a35*a11-a55*a43*a34*a12/ (%1);

inv63=
        (-a21*a44*a55*a12-
        a21*a12*a64*a45*a53+a21*a15*a54*a43+a21*a54*a45*a12+a21*a14*a45*a53-
        a21*a54*a45*a13+a44*a11*a25*a53+a44*a55*a12*a23-
        a22*a15*a54*a43+a22*a11*a64*a45*a53-a54*a45*a12*a23-
        a44*a12*a25*a53+a44*a22*a15*a53-a44*a55*a11*a23+a44*a55*a22*a11-a44*a55*a22*a13-
        a14*a22*a45*a53-a11*a24*a45*a53+a22*a11*a65*a54*a43-a11*a25*a54*a43-
        a55*a22*a11*a64*a43-a44*a22*a11*a65*a53+a54*a45*a22*a13+a54*a45*a11*a23-
        a55*a12*a24*a43+a12*a24*a45*a53+a55*a11*a24*a43+a55*a14*a43*a22+a12*a25*a54*a43-
        a54*a45*a22*a11-a21*a12*a65*a54*a43+a21*a44*a55*a13+a21*a44*a12*a65*a53-
        a21*a44*a15*a53-a21*a55*a14*a43+a21*a55*a12*a64*a43/ (%1);

inv64=
        (-a33*a55*a11*a24-a33*a12*a25*a54+a33*a55*a12*a24+a33*a22*a15*a54-
        a33*a22*a11*a65*a54+a33*a55*a22*a11*a64-
        a33*a55*a22*a14+a33*a11*a25*a54+a55*a22*a13*a34-a22*a15*a53*a34+a12*a23*a35*a54-
        a53*a35*a12*a24-a53*a35*a22*a11*a64-a55*a12*a23*a34+a55*a11*a23*a34-
        a22*a13*a35*a54+a53*a35*a11*a24-a11*a25*a53*a34+a22*a11*a35*a54+a53*a35*a22*a14-
        a11*a23*a35*a54+a22*a11*a65*a53*a34+a12*a25*a53*a34-
        a55*a22*a11*a34+a21*a53*a35*a12*a64-a21*a12*a65*a53*a34-a21*a12*a35*a54-
        a21*a55*a13*a34+a21*a55*a12*a34+a21*a13*a35*a54+a21*a15*a53*a34-a21*a53*a35*a14-
        a21*a33*a55*a12*a64-a21*a33*a15*a54+a21*a33*a55*a14+a21*a33*a12*a65*a54/ (%1);

inv65=
```

```
-(a43*a34*a22*a11*a65+a44*a22*a11*a35-a43*a34*a22*a15+a44*a12*a23*a35-
a43*a34*a11*a25+a43*a34*a12*a25-a44*a22*a13*a35-
a44*a11*a23*a35+a14*a43*a22*a35+a13*a34*a22*a45-a22*a11*a34*a45+a11*a23*a34*a45-
a22*a11*a64*a43*a35+a11*a24*a43*a35-a12*a24*a43*a35-
a12*a23*a34*a45+a33*a44*a22*a15-a33*a44*a22*a11*a65-
a33*a14*a22*a45+a33*a44*a11*a25+a33*a12*a24*a45-a33*a44*a12*a25-
a33*a11*a24*a45+a33*a22*a11*a64*a45-a21*a33*a44*a15-
a21*a33*a12*a64*a45+a21*a33*a14*a45+a21*a33*a44*a12*a65-a21*a44*a12*a35-
a21*a13*a34*a45+a21*a12*a64*a43*a35+a21*a44*a13*a35-a21*a43*a34*a12*a65-
a21*a14*a43*a35+a21*a12*a34*a45+a21*a43*a34*a15) / (%1);

inv66=
(a21*a33*a44*a55*a12-a21*a33*a54*a45*a12-a21*a44*a53*a35*a12-
a21*a55*a43*a34*a12+a21*a53*a34*a45*a12+a21*a54*a43*a35*a12-
a33*a44*a55*a22*a11+a33*a54*a45*a22*a11+a53*a22*a35*a11*a44-a54*a43*a22*a35*a11-
a53*a34*a22*a45*a11+a43*a34*a55*a22*a11) / (%1);



%1=-a33*a44*a22*a15*a56-
a33*a44*a55*a12*a26+a21*a13*a34*a45*a56+a21*a33*a54*a45*a16+a21*a53*a35*a12*a64*a46-
a54*a45*a22*a11*a36-a43*a34*a22*a11*a65*a56+a54*a45*a22*a13*a36+a54*a45*a11*a23*a36-
a54*a45*a12*a23*a36+a55*a43*a34*a12*a26+a55*a43*a34*a22*a11*a66-a55*a43*a34*a11*a26-
a55*a12*a23*a34*a46+a55*a11*a24*a43*a36-a55*a12*a24*a43*a36-
a55*a43*a34*a22*a16+a55*a13*a34*a22*a46-a55*a22*a11*a34*a46+a55*a11*a23*a34*a46-
a54*a43*a35*a22*a11*a66+a54*a43*a35*a11*a26+a55*a14*a43*a22*a36+a53*a34*a45*a22*a16-
a53*a34*a45*a12*a26-a55*a22*a11*a64*a43*a36+a54*a43*a35*a22*a16-a54*a43*a35*a12*a26-
a53*a34*a45*a22*a11*a66+a53*a34*a45*a11*a26-a14*a43*a22*a35*a56-
a13*a34*a22*a45*a56+a22*a11*a34*a45*a56+a22*a11*a35*a54*a46+a43*a34*a22*a15*a56+a53*a35*
a14*a22*a46-a53*a35*a12*a24*a46+a53*a35*a11*a24*a46-a53*a35*a22*a11*a64*a46-
a11*a23*a35*a54*a46+a22*a11*a65*a53*a34*a46-a14*a22*a45*a53*a36-a11*a25*a54*a43*a36-
a11*a25*a53*a34*a46+a12*a24*a45*a53*a36-a11*a24*a45*a53*a36-
a11*a23*a34*a45*a56+a12*a23*a35*a54*a46+a43*a34*a11*a25*a56+a12*a25*a54*a43*a36+a12*a25*
a53*a34*a46-a43*a34*a12*a25*a56-a22*a13*a35*a54*a46+a22*a11*a65*a54*a43*a36-
a44*a55*a22*a13*a36-a44*a22*a11*a35*a56-
a44*a55*a11*a23*a36+a22*a11*a64*a45*a53*a36+a22*a11*a64*a43*a35*a56-
a11*a24*a43*a35*a56+a12*a24*a43*a35*a56+a12*a23*a34*a45*a56-a22*a15*a54*a43*a36-
a22*a15*a53*a34*a46+a44*a55*a12*a23*a36+a44*a53*a35*a12*a26-a44*a12*a25*a53*a36-
a44*a12*a23*a35*a56+a44*a11*a25*a53*a36+a44*a11*a23*a35*a56+a44*a22*a13*a35*a56-
a44*a53*a35*a22*a16+a44*a55*a22*a11*a36-a44*a22*a11*a65*a53*a36+a44*a53*a35*a22*a11*a66-
a44*a53*a35*a11*a26+a44*a22*a15*a53*a36+a33*a44*a12*a25*a56-
a33*a44*a55*a22*a11*a66+a33*a44*a55*a11*a26-
a33*a44*a11*a25*a56+a33*a44*a22*a11*a65*a56+a33*a44*a55*a22*a16-
a33*a12*a25*a54*a46+a33*a55*a22*a11*a64*a46+a33*a54*a45*a12*a26-a33*a54*a45*a22*a16-
a33*a22*a11*a65*a54*a46-a33*a55*a11*a24*a46-
a33*a55*a14*a22*a46+a33*a55*a12*a24*a46+a33*a54*a45*a22*a11*a66+a33*a11*a24*a45*a56-
a33*a54*a45*a11*a26+a33*a22*a15*a54*a46+a33*a11*a25*a54*a46+a33*a14*a22*a45*a56-
a33*a22*a11*a64*a45*a56-a33*a12*a24*a45*a56-a21*a33*a44*a12*a65*a56-
a21*a55*a43*a34*a12*a66+a21*a54*a45*a12*a36-a21*a54*a45*a13*a36-
a21*a55*a14*a43*a36+a21*a55*a43*a34*a16+a21*a55*a12*a34*a46-a21*a55*a13*a34*a46-
a21*a54*a43*a35*a16+a21*a54*a43*a35*a12*a66-
a21*a53*a34*a45*a16+a21*a53*a34*a45*a12*a66+a21*a55*a12*a64*a43*a36+a21*a15*a53*a34*a46-
a21*a15*a43*a34*a56+a21*a14*a45*a53*a36-a21*a12*a64*a45*a53*a36-
a21*a53*a35*a14*a46+a21*a15*a54*a43*a36-a21*a12*a65*a53*a34*a46+a21*a12*a65*a43*a34*a56-
```

a21*a12*a35*a54*a46+a21*a14*a43*a35*a56-a21*a12*a34*a45*a56-
a21*a12*a65*a54*a43*a36+a21*a44*a55*a13*a36-a21*a12*a64*a43*a35*a56+a21*a13*a35*a54*a46-
a21*a44*a55*a12*a36+a21*a44*a53*a35*a16+a21*a44*a12*a35*a56+a21*a44*a12*a65*a53*a36-
a21*a44*a15*a53*a36-a21*a44*a53*a35*a12*a66-a21*a44*a13*a35*a56+a21*a33*a44*a55*a12*a66-
a21*a33*a44*a55*a16+a21*a33*a44*a15*a56+a21*a33*a55*a14*a46-a21*a33*a15*a54*a46-
a21*a33*a54*a45*a12*a66+a21*a33*a12*a65*a54*a46-a21*a33*a14*a45*a56-
a21*a33*a55*a12*a64*a46+a21*a33*a12*a64*a45*a56;