**Es gilt:**

phi[1](t) = x\_1

diff(phi[1](t), t) = x\_2

phi[2](t) = x\_3

diff(phi[2](t), t) = x\_4

**Gleichungen in Vektorform:**

[x\_2 ;

1/(l\_1^2\*(9\*cos(x\_1-x\_3)^2\*m\_2-4\*m\_1-12\*m\_2-12\*m\_3)\*l\_2)\*(9\*x\_2^2\*cos(x\_1-x\_3)\*sin(x\_1-x\_3)\*l\_1^2\*l\_2\*m\_2+6\*m\_2\*l\_1\*l\_2^2\*sin(x\_1-x\_3)\*x\_4^2+9\*u\*cos(x\_1-x\_3)\*cos(x\_3)\*l\_1\*l\_2\*m\_2+9\*cos(x\_1-x\_3)\*sin(x\_3)\*g\*l\_1\*l\_2\*m\_2-6\*l\_1\*cos(x\_1)\*u\*m\_1\*l\_2-12\*l\_1\*cos(x\_1)\*u\*m\_2\*l\_2-12\*l\_1\*cos(x\_1)\*u\*m\_3\*l\_2-6\*l\_1\*g\*sin(x\_1)\*m\_1\*l\_2-12\*l\_1\*g\*sin(x\_1)\*m\_2\*l\_2-12\*l\_1\*g\*sin(x\_1)\*m\_3\*l\_2+18\*x\_2\*cos(x\_1-x\_3)\*d\_p2\*l\_1-18\*x\_4\*cos(x\_1-x\_3)\*d\_p2\*l\_1+12\*x\_2\*d\_p1\*l\_2+12\*x\_2\*d\_p2\*l\_2-12\*d\_p2\*x\_4\*l\_2);

x\_4;

-1/(l\_1\*l\_2^2\*(9\*cos(x\_1-x\_3)^2\*m\_2-4\*m\_1-12\*m\_2-12\*m\_3)\*m\_2)\*(12\*x\_2\*d\_p2\*l\_1\*m\_1+36\*x\_2\*d\_p2\*l\_1\*m\_2+36\*x\_2\*d\_p2\*l\_1\*m\_3-12\*x\_4\*d\_p2\*l\_1\*m\_1-36\*x\_4\*d\_p2\*l\_1\*m\_2-36\*x\_4\*d\_p2\*l\_1\*m\_3-9\*cos(x\_1)\*u\*cos(x\_1-x\_3)\*l\_1\*l\_2\*m\_1\*m\_2-18\*cos(x\_1)\*u\*cos(x\_1-x\_3)\*l\_1\*l\_2\*m\_2\*m\_3-9\*cos(x\_1-x\_3)\*sin(x\_1)\*g\*l\_1\*l\_2\*m\_1\*m\_2-18\*cos(x\_1-x\_3)\*sin(x\_1)\*g\*l\_1\*l\_2\*m\_2\*m\_3+9\*x\_4^2\*cos(x\_1-x\_3)\*sin(x\_1-x\_3)\*l\_1\*l\_2^2\*m\_2^2+ 6\*x\_2^2\*sin(x\_1-x\_3)\*l\_1^2\*l\_2\*m\_1\*m\_2+ 18\*x\_2^2\*sin(x\_1-x\_3)\*l\_1^2\*l\_2\*m\_2\*m\_3-18\*cos(x\_1)\*u\*cos(x\_1-x\_3)\*l\_1\*l\_2\*m\_2^2-18\*cos(x\_1-x\_3)\*sin(x\_1)\*g\*l\_1\*l\_2\*m\_2^2 +6\*u\*cos(x\_3)\*l\_1\*l\_2\*m\_1\*m\_2+18\*u\*cos(x\_3)\*l\_1\*l\_2\*m\_2\*m\_3+6\*sin(x\_3)\*g\*l\_1\*l\_2\*m\_1\*m\_2+18\*sin(x\_3)\*g\*l\_1\*l\_2\*m\_2\*m\_3 + 18\*(x\_2)^2\*sin(x\_1-x\_3)\*l\_1^2\*l\_2\*m\_2^2+18\*u\*cos(x\_3)\*l\_1\*l\_2\*m\_2^2+18\*sin(x\_3)\*g\*l\_1\*l\_2\*m\_2^2+18\*x\_2\*cos(x\_1-x\_3)\*d\_p1\*l\_2\*m\_2 + 18\*x\_2\*cos(x\_1-x\_3)\*d\_p2\*l\_2\*m\_2-18\*x\_4\*cos(x\_1-x\_3)\*d\_p2\*l\_2\*m\_2)]

**Ausgangsmatrix**

C = [1 0 0 0; 0 0 1 0]

**Parametervektor**

[g l\_1 l\_2 m\_1 m\_2 m\_3 d\_p1 d\_p2]