Contents


```
function [tau,P_mech] = rnea(q1, q2, q3, q4, q5, q6, qd1, qd2, qd3, qd4, qd5, qd6, qdd1, qdd2, qdd3, qdd4, qdd5, qdd6)
```

Initialisierung

```
    qd = [qd1, qd2, qd3, qd4, qd5, qd6];
    qdd = [qdd1, qdd2, qdd3, qdd4, qdd5, qdd6];
    omega = zeros(3,1,6);
    omega_d = zeros(3,1,6);
    a = zeros(3,1,6);
    a_com = zeros(3,1,6);
    f = zeros(3,1,6);
    mu = zeros(3,1,6);
    tau = zeros(1,1,6);
    P_mech = zeros(1,1,6);
```

```
Not enough input arguments.

Error in rnea (line 3)
    qd = [qd1, qd2, qd3, qd4, qd5, qd6];
```

Vorwärtskinematik

```
    [~,R] = dhtrafo(q1, q2, q3, q4, q5, q6);
```

Parameter in der Reihenfolge: $I_i^i,\ r_{i,C_i}^i,\ r_{i-1,i}^i,\ m_i,\ i_i$

```
    [I,rec,rae,m,G] = parameter();
```

Winkelgeschwindigkeit ω_i^i

```
    for i=1:6
        if i == 1
            omega(:,:,i) = R(:,:,i)'*([0;0;0] +         qd(i)*[0;0;1]);
        else
            omega(:,:,i) = R(:,:,i)'*(omega(:,:,i-1) +  qd(i)*[0;0;1]);
        end
    end
```

Winkelbeschleunigung $\dot{\omega}_i^i$

```
    for i=1:1:6
        if i == 1
            omega_d(:,:,i) = R(:,:,i)'*([0;0;0] +           qdd(i)*[0;0;1]+cross(qd(i)*[0;0;0],         [0;0;1]));
        else
            omega_d(:,:,i) = R(:,:,i)'*(omega_d(:,:,i-1) +  qdd(i)*[0;0;1]+cross(qd(i)*omega(:,:,i-1),  [0;0;1]));
        end
    end
```

Lineare Beschleunigung $\ddot{p}_i^i$ (Siciliano) a_e (Spong)

```
    for i=1:6
        if i == 1
            a(:,:,i) = R(:,:,i)'* [0;0;-9.81]   + cross(omega_d(:,:,i),rae(:,:,i)) + cross(omega(:,:,i),(cross(omega(:,:,i), rae(:,:,i))));
        else
            a(:,:,i) = R(:,:,i)'*a(:,:,i-1)     + cross(omega_d(:,:,i),rae(:,:,i)) + cross(omega(:,:,i),(cross(omega(:,:,i), rae(:,:,i))));
        end
    end
```

Lineare Beschleunigung $\ddot{p}_{C_i}^i$ (Siciliano) a_c (Spong)

```
    for i=1:1:6
        a_com(:,:,i) = a(:,:,i) + cross(omega_d(:,:,i),rec(:,:,i)) + cross(omega(:,:,i),(cross(omega(:,:,i), rec(:,:,i))));
    end
```

Kraft f_i^i

```
    for i = 6:-1:1
        if i == 6
            f(:,:,i) = eye(3)*[0;0;0]        + m(i)*a_com(:,:,i);
        else
            f(:,:,i) = R(:,:,i+1)*f(:,:,i+1) + m(i)*a_com(:,:,i);
        end
    end
```

Drehmoment μ_i^i

```
    for i = 6:-1:1
        if i == 6
            mu(:,:,i) = cross(-f(:,:,i),(rae(:,:,i)+rec(:,:,i))) + eye(3)*[0;0;0]          + eye(3)*cross([0;0;0], rec(:,:,i))        + I(:,:,i)*omega_d(:,:,i)
        else
            mu(:,:,i) = cross(-f(:,:,i),(rae(:,:,i)+rec(:,:,i))) + R(:,:,i+1)*mu(:,:,i+1) + R(:,:,i+1)*cross(f(:,:,i+1), rec(:,:,i)) + I(:,:,i)*omega_d(:,:,i)
        end
    end
```

Drehmoment τ_i im KS{i-1}

```
    for i = 1:1:6
        tau(i) = transpose(mu(:,:,i)) * (R(:,:,i))'*[0;0;1] * G(i);
    end
    for i = 1:1:6
        P_mech(i) = tau(i)*qd(i)/G(i);
    end
```

```
end
```

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