Robot Dynamics

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github.com/silvasta/summary-rodyn

created with grok

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some definitions

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euler <> rotation matrix

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Quaternions <> rotation matrix

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3.1   Position vs. Torque Controlled Robot Arms

3.2   Joint Impedance and Inverse Dynamics Control

Joint Impedance Control

- Formula

- Formula with Gravity compensation

Inverse Dynamics Control

Compensate for system dynamics + PD law on acceleration

- every joint behaves like decoupled mass-spring damper

- Eigenfrequency

- Damping

Task-space dynamics control

- single task: just use pseudo-inverse

- multiple task: stack J_i, w_i, pseudo-inverse, done (equal priority)

3.3   Task-space Dynamics Control

4   Legged Robot

5   Rotorcraft

6   Fixed-Wing