



Transforming Sensor Data to Increase Robustness in the Control of Calibration-Free Robots

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Problem

If a robot with n DOF is sufficient to accomplish a specific task then

**n control words must be computed:
 n equations are necessary and sufficient.**

If a set of m sensor data ($m > n$) is available for the computation we have m equations:

- ▶ **overdetermined system (problem!)**
- ▶ **redundant sensor data (opportunity!)**

Goal:

- ▶ **Real-time solution**
- ▶ **Robustness through sensor data redundancy**
- ▶ **Minimization of dimensionality
(in the interest of learning)**



Possible Solutions

a) Computation of pseudoinverse

- ▶ time-consuming
- ▶ no reduction of dimensionality

b) Discarding redundant sensor data (as presented earlier)

- ▶ fast
- ▶ wasteful, non-optimal
- ▶ difficult to decide which data to discard

c) Transforming sensor data into n -D subspace (as presented in the sequel)

- ▶ fast
- ▶ robust
- ▶ reduction of dimensionality

