1. Geometry

5 minutes trailer

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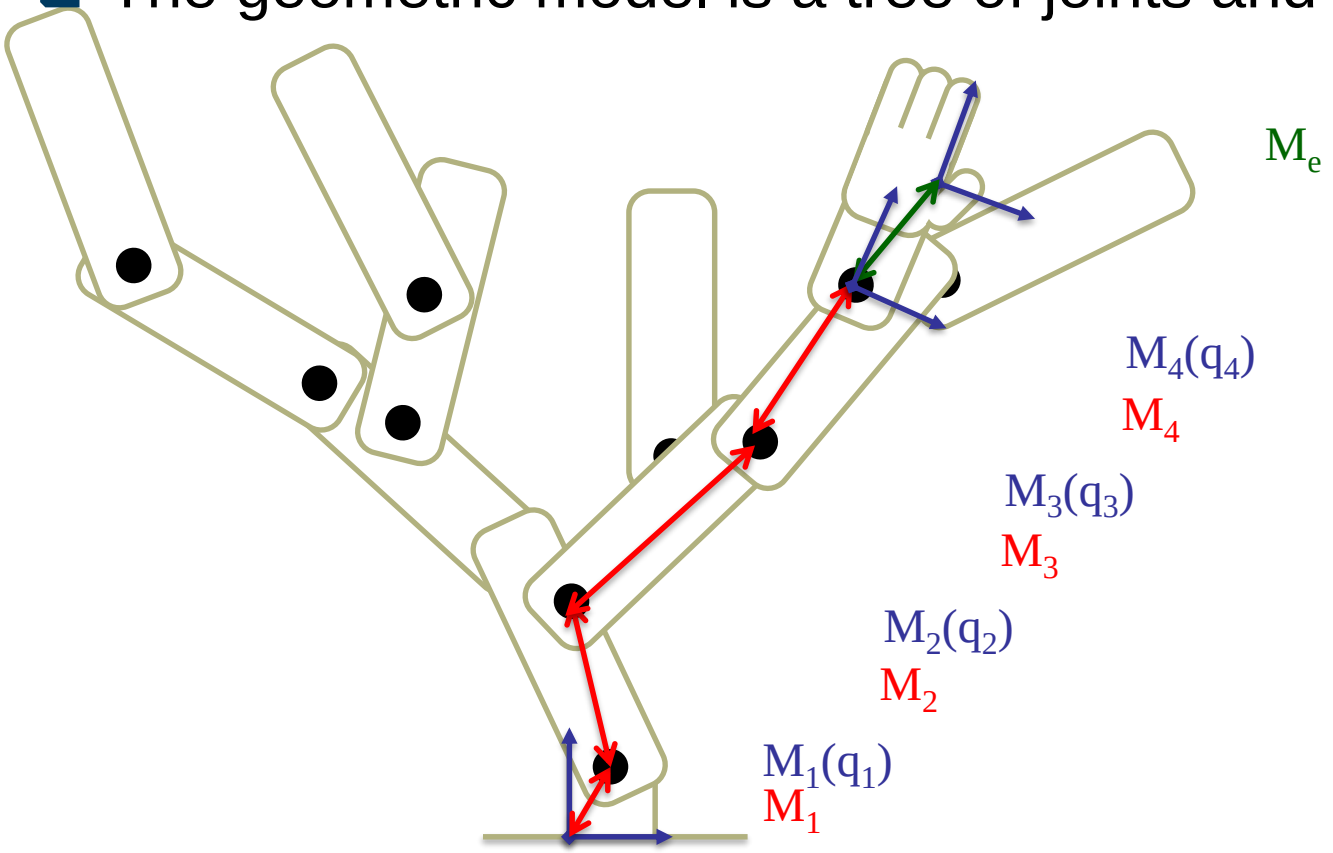
Direct geometry

- The geometric model is a tree of joints and bodies



$$M(q) = M_1 \oplus M_1(q_1) \oplus M_2 \oplus \ldots \oplus M_4 \oplus M_4(q_4) \oplus M_e$$

About representation of motion

- The geometric model is a tree of joints and bodies
  - What is $M \in SE(3)$
  - What is $\oplus$
  - Links with the differential geometry

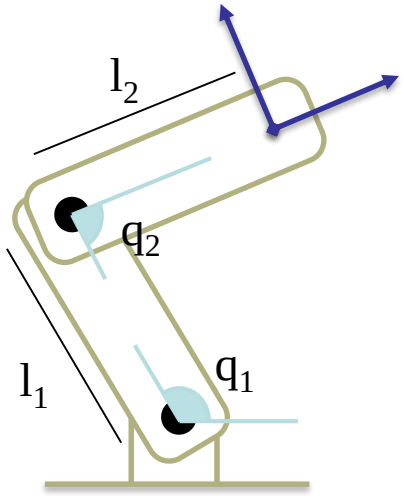
$$M(q) = M_1 \oplus M_1(q_1) \oplus M_2 \oplus \ldots \oplus M_4 \oplus M_4(q_4) \oplus M_e$$

Inverse geometry

- Being given a x^* …
- what is q such that $h(q) = x^*$

$$M^{-1}: x^* \rightarrow q = M^{-1}(x^*)$$

$$M(q) = \begin{bmatrix} l_1 \cos(q_1) + l_2 \cos(q_1+q_2) \\ l_1 \sin(q_1) + l_2 \sin(q_1+q_2) \end{bmatrix}$$



Follow the slope

- Decreasing sequence: $f(x_{k+1}) < f(x_k)$