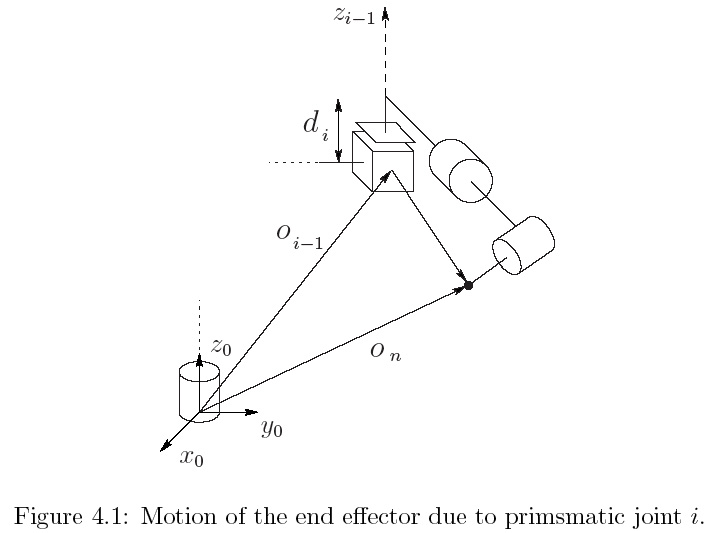


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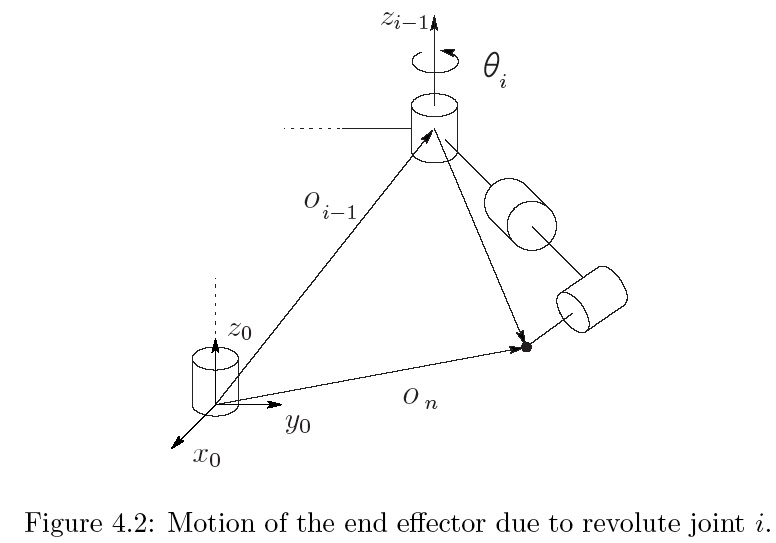
**Class Worksheet – Lecture 12** The manipulator Jacobian

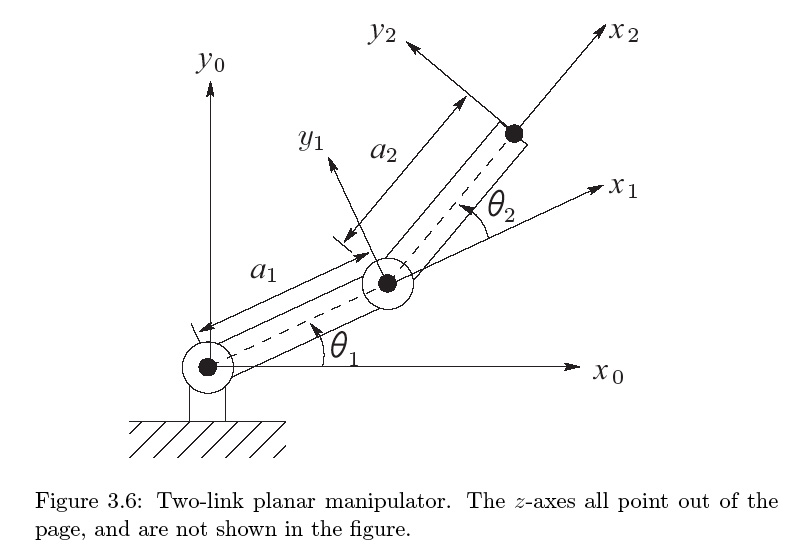


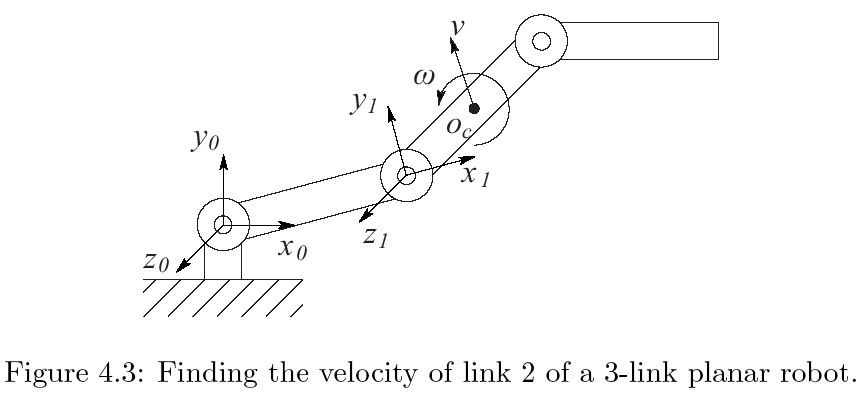
note: implies

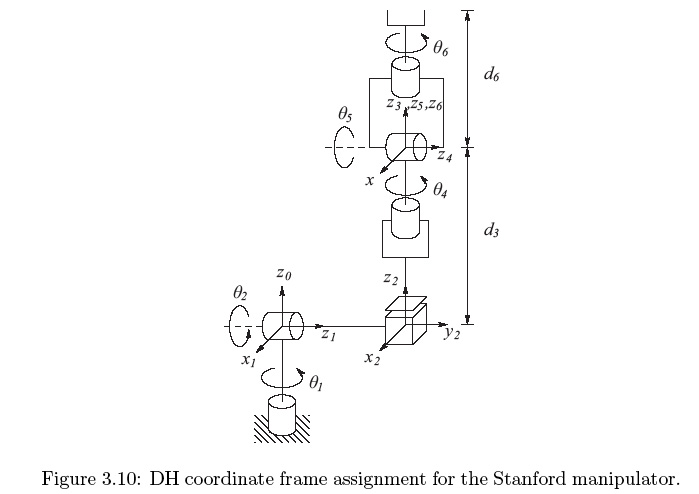
upper half:

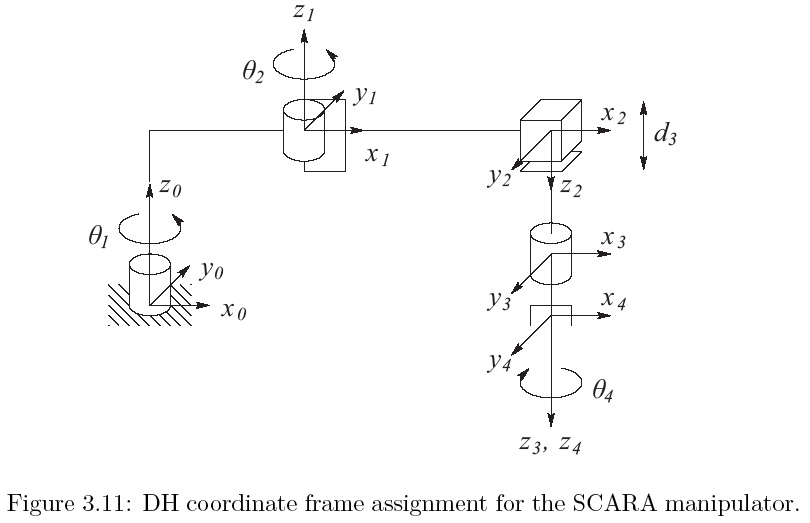
lower half:













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**Class Worksheet – Preparation for Lecture 13**

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1. **For the three-link planar manipulator of Example 4-6, compute the vector oc and derive the manipulator Jacobian matrix**