

**ECE 5397/6397: Intro to Robotics**

**Class Worksheet – Lecture 11** so(3) and the derivative of a rotation matrix, velocity of a point attached to a moving frame, addition of angular velocities

Which of the following matrices are *skew symmetric*?

,

is skew symmetric, i.e. ,

1. For and
2. For
3. For and
4. For ,



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**Class Worksheet – Preparation for Lecture 11**

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1. **Two frames**  and are related by the homogenous transformation

A particle has velocity relative to frame . What is the velocity of the particle in frame ?