Advanced Dynamics
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Lecture - 45
Kinematics of Rotation - V

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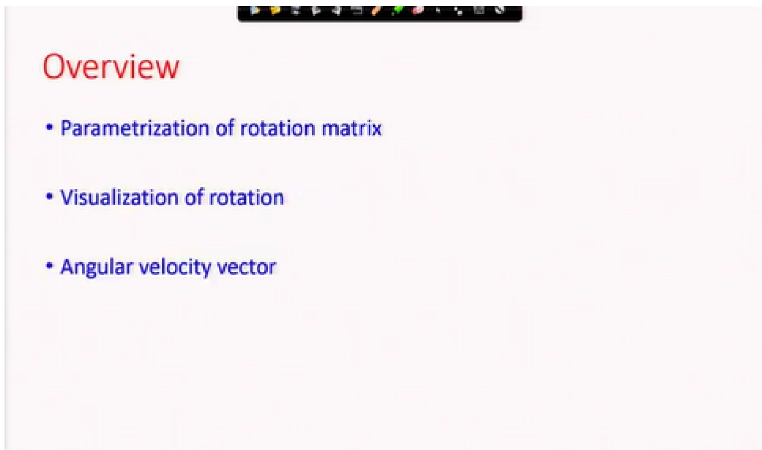

In this lecture we are going to continue our discussions on Kinematics of rotation. We were discussing parameterization of the rotation matrix and visualization of rotation. Here we will also look at the representation of the angular velocity vector. And we are going to represent the angular velocity vector in terms of the parameters, the rotation parameter rates.

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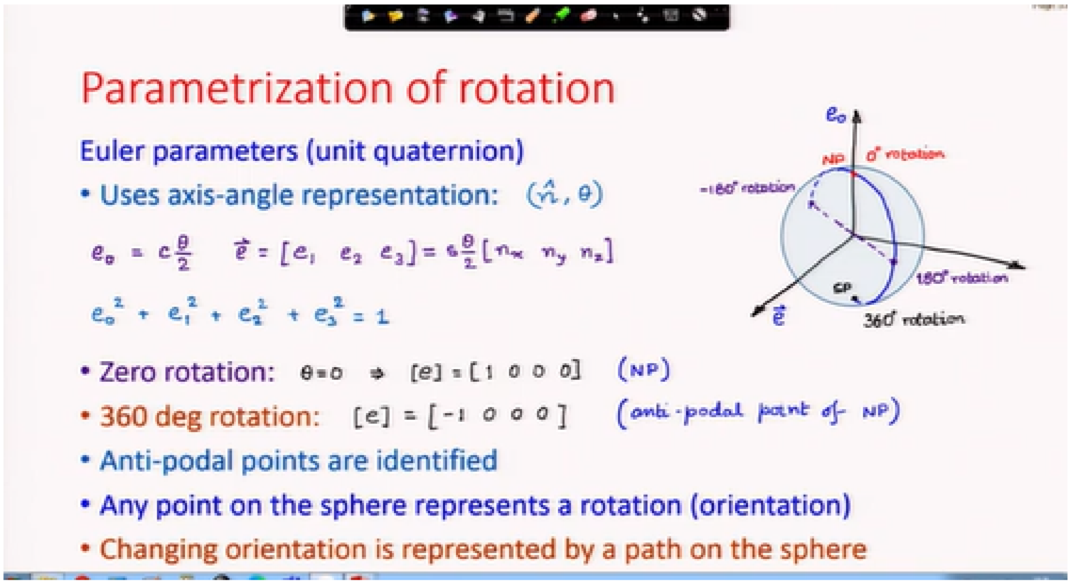

The above slide presents the Euler parameters for representing orientation of a rigid body. This is also known as the unit quaternion.

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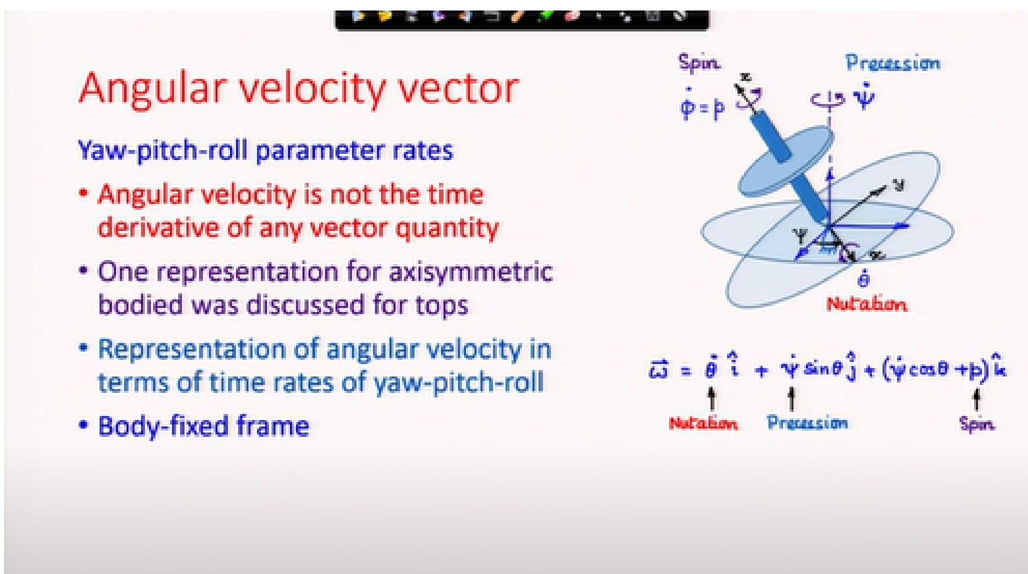

We have already looked at this yaw pitch roll parametrization. Now we are going to use these parameters to represent angular velocity. Remember that angular velocity vector is not a derivative of any other vector. Here, we will represent it in terms of derivatives of the yaw, pitch roll parameters.

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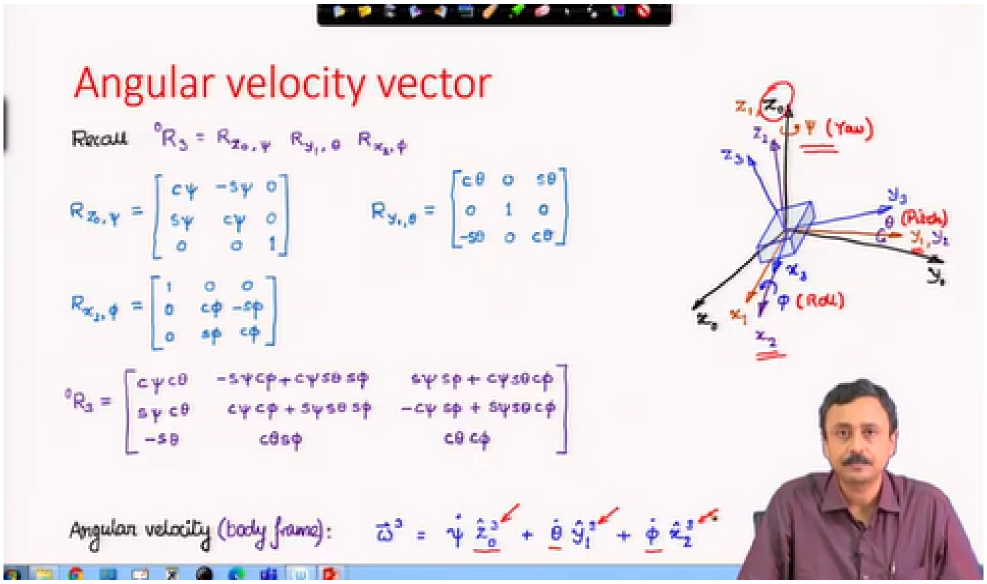

First recall the rotation matrix representing the orientation of a body in terms of the yaw pitch and roll coordinates as presented in the slide above.

The following 2 slides discuss the representation of the angular velocity in terms of the yaw rate, pitch rate and roll rate.

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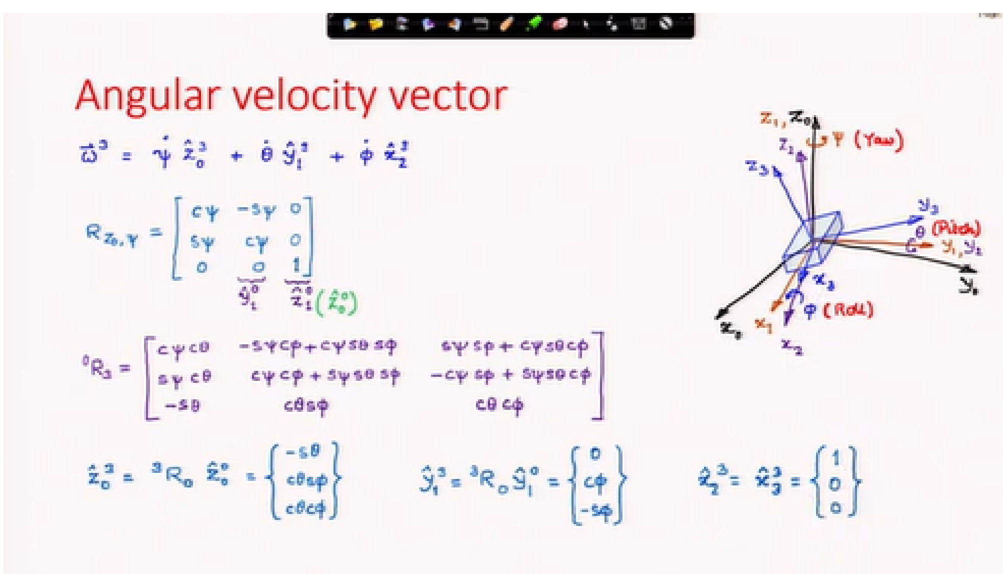

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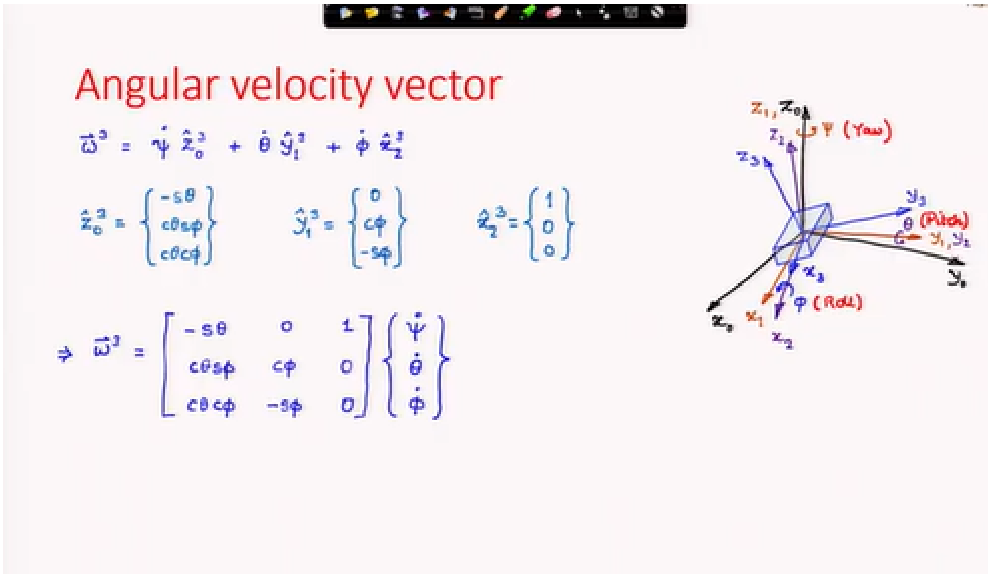

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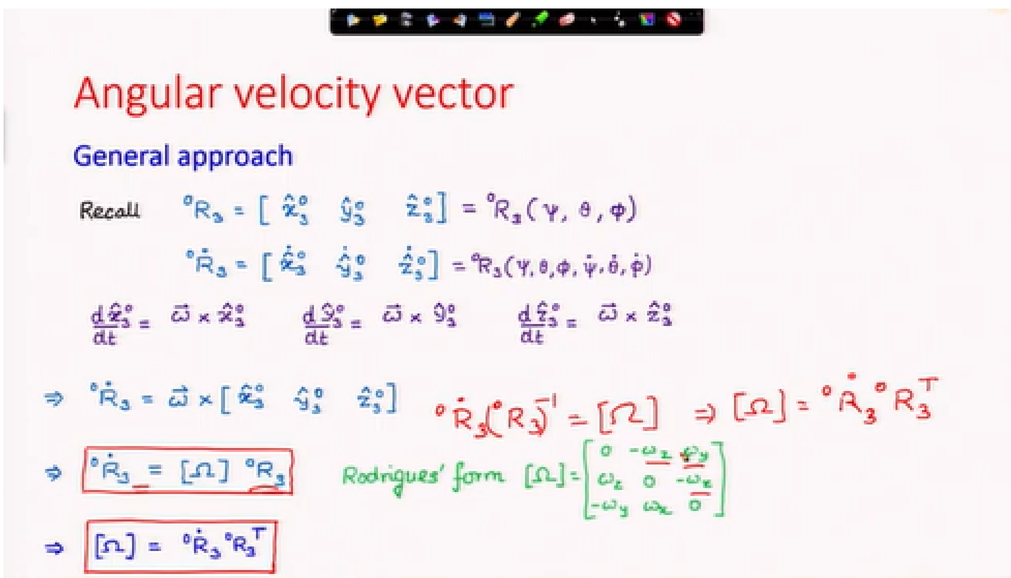

We can have a general approach as presented in the slide above.

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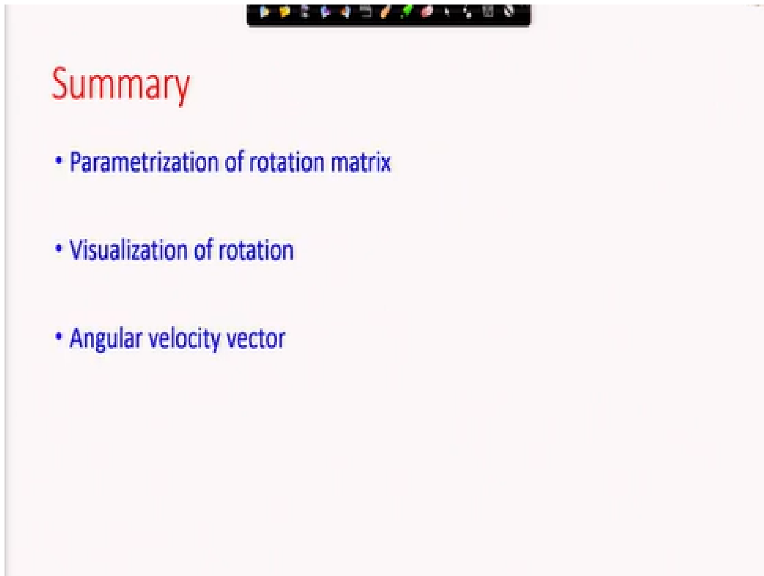

The discussions are summarized in the above slide.