



-
- | | |
|-------------------------------|--|
| 1. What is Locomotion? | It is a collective name for the various methods that robots use to transport themselves from place to place. |
|-------------------------------|--|
-
- | | |
|---|---|
| 2. Why is it not always a good idea to replicate nature when designing locomotive systems? | <ul style="list-style-type: none">- Mechanical complexity through structural replication- Miniaturization with robustness- Efficiencies |
|---|---|
-
- | | |
|---|--|
| 3. What are the key issues for locomotion? | <ul style="list-style-type: none">- Stability- Characteristics of contact- Type of environment |
|---|--|
-
- | | |
|--|---|
| 4. What is the most popular locomotion mechanism, and why is it the most popular? | <p>The wheel!</p> <ul style="list-style-type: none">- Good efficiency- Simple mechanical implementation- Easy balance |
|--|---|
-
- | | |
|---|--|
| 5. What are their four major wheel classes, and their DOF? | <p>STANDARD WHEEL - 2</p> <p>CASTOR WHEEL - 2</p> <p>MECANUM/SWEDISH WHEEL - 3</p> <p>BALL/SPHERICAL WHEEL - 3</p> |
|---|--|
-
- | | |
|--|--|
| 6. What are the three fundamental characteristics of a robot? | <ul style="list-style-type: none">- Stability: Number of wheels and the configuration of a wheeled robot- Maneuverability: How easily the robot can be maneuverable.- Controllability: How easily the robot can be controlled (generally inverse to maneuverability) |
|--|--|
-



7. **How do we get the velocity of a 2-wheel differential drive robot in its local space?**
- $$v_x = r \cdot w_L / 2 + r \cdot w_R / 2$$
- $$v_y = 0$$
- $$w = -r \cdot w_L / (2 \cdot l) + r \cdot w_R / (2 \cdot l)$$
- $$\text{zeta} = [v_x, v_y, w]$$
-