report for interview2

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1 Answers of rule quiz

1. content
2. Egress is considered complete when the driver stands next to the car both feet on the ground.
3. Yes
4. None of the above
5. Teams must install the standardised data logger piece of hardware provided by the officials on their vehicle.
6. Only one-way-telemetry for information retrieval is allowed.

2 Exercise 2

2.1 Task 1

$$\dot{x} = vcos\theta \tag{1}$$

$$\dot{y} = vsin\theta \tag{2}$$

$$\dot{\theta} = \frac{v}{L}tan\delta \tag{3}$$

1. The states are x,y and θ.
2. The inputs are v and δ (or tanδ).
3. Assume the working point is with state (x_1,y_1,θ_1), and input (v_1, δ_1) Let A be the Jacobian matrix with respect to the states

$$A = \begin{bmatrix} 0 & 0 & -vsin\theta_1 \\ 0 & 0 & vcos\theta_1 \\ 0 & 0 & 0 \end{bmatrix} \tag{4}$$

Let B be the Jacobian matrix with respect to the inputs

$$B = \begin{bmatrix} cos\theta_1 & 0 \\ sin\theta_1 & 0 \\ \frac{tan\delta_1}{L} & \frac{1}{cos\delta_1^2} \end{bmatrix} \tag{5}$$

$$\begin{bmatrix} \dot{x} \\ \dot{y} \\ \dot{\theta} \end{bmatrix} = A \begin{bmatrix} x \\ y \\ \theta \end{bmatrix} + B \begin{bmatrix} v \\ \delta \end{bmatrix} \tag{6}$$