Reach set:

Where can the robot be at a future time subject to the dynamics and current knowledge of uncertainties?

\[ d \text{ dimensional reach set volume at time } t \text{ for } |u| \leq \mu: \]

\[
\text{vol}(\mathcal{R}(\{x_0\}, t)) = (2\mu)^d t^{d+1} \prod_{k=1}^{d-1} \frac{k!}{(2k+1)!}
\]

Diameter of the reach set:

\[
\text{diam}(\mathcal{R}(\{x_0\}, t)) = 2\mu \sqrt{\sum_{j=1}^{d} \left( \frac{t^j}{j!} \right)^2}
\]