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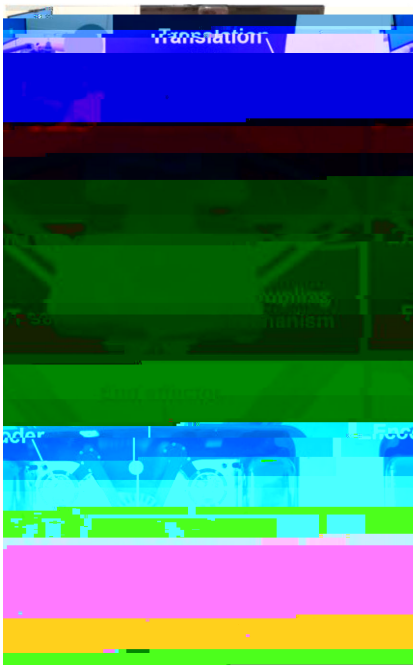


Fig. 1. (Top) Design of DORIS with the decoupled user workspace. The end effector (handle) can be mo ed freely within the decoupling mechanism, which is disjointed from all the translation links, rotation links, and actuators. The inset figure represents a user manipulating the end effector of DORIS. (Bottom) Design of the decoupling mechanism. Four encoders at each corner are utilized for calculation of the position and angle of the end effector. When the brakes are engaged, the mo ement of the end effector is no longer allowed. ote that a handle is remo ed in the top figure to make the structure more clearly isible.

TABLE I
SPECIFICATIO S OF DORIS. ALL ARE EASURED VALUES

It

Fig. 3. Schematic of the fi e-bar linkage mechanism inside of the decoupling mechanism. The relati e position ( $_{EE/DM}$ ) and relati e rotation angle ( $_{EE/DM}$ ) of the end effector (solid black square) referenced to the decoupling mechanism can be obtained by using four measured angles ( $_1$, $_2$, $_3$, and

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TABLE II

EASURED ASS

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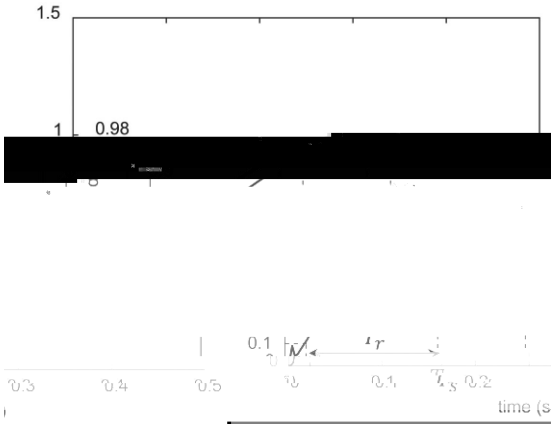


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