Vision Based Navigation Assignment 3

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Exercise 2

Points $\boldsymbol{x}_L$ and $\boldsymbol{x}_R$ from a stereo camera (considered in a two view case) are related as:

$$\begin{aligned}
\lambda_R \boldsymbol{x}_R &= \boldsymbol{X} \\
\lambda_L \boldsymbol{x}_L &= \boldsymbol{R}\boldsymbol{X} + \boldsymbol{T} \\
\lambda_L \boldsymbol{x}_L &= \boldsymbol{R}\lambda_R \boldsymbol{x}_R + \boldsymbol{T} \\
\lambda_L \hat{\boldsymbol{T}} \boldsymbol{x}_L &= \lambda_R \hat{\boldsymbol{T}} \boldsymbol{R} \boldsymbol{x}_R \\
\boldsymbol{x}_L^T \hat{\boldsymbol{T}} \boldsymbol{R} \boldsymbol{x}_R &= 0 \\
\boldsymbol{E} &= \hat{\boldsymbol{T}} \boldsymbol{R}
\end{aligned}$$

where λ_R and λ_L are respective projections to 3D, $\boldsymbol{R}$ is rotation and $\boldsymbol{T}$ is translation from $\boldsymbol{x}_R$ to $\boldsymbol{x}_L$.