# 1  Question 1

Specific calculation question, involving information fusion using Bayes rule (like the drone landing example from lectures).

# 2  Question 2

A moving robot obtains GPS observations $z^{GPS}$ and image observations of a single landmark $z^{im}$ at each time index $t_{0:k}$.

## 2.1

Develop the posterior at time $k$

## 2.2

Draw the corresponding factor graph. Explain in detail what each node and edge correspond to.

## 2.3

Assume now that poses are precisely known. Derive posterior and draw factor graph.

# Question 3

## 2.4

Camera 6 DoF pose is given $x_1 = (R_1 \equiv R_{c_1}^G, t_1 \equiv t_{c_1 \rightarrow G}^G)$. Landmark in camera coordinate system (3D) is given $l^{c_1}$. Find $l^G$

## 2.5

Another camera $x_2 = (R_{c_2}^G, t_2 \equiv t_{c_2 \to G}^G)$ observes landmark $l^G$.

### 2.5.1

Write down the ideally projected point (in homogeneous coordinates) $\begin{pmatrix} \tilde{u} \\ \tilde{v} \\ \tilde{w} \end{pmatrix}$

### 2.5.2

Camera observes landmark at $z_2 = \begin{pmatrix} u_2 \\ v_2 \end{pmatrix}$ What is the reprojection error?