


1.  (5 Points) Draw a simple factor graph by hand or with a computer program, such as PowerPoint, that meets the following criteria.

- Three pose states  $x_0, x_1$ , and  $x_2$ .
- Two landmarks,  $\ell_0$  and  $\ell_1$ , marked by a 2D position.
- Four range and bearing measurements as follows:
  - $y_{0,0}^{rb}$ : between pose  $x_0$  and landmark  $\ell_0$
  - $y_{0,1}^{rb}$ : between pose  $x_0$  and landmark  $\ell_1$
  - $y_{1,1}^{rb}$ : between pose  $x_1$  and landmark  $\ell_1$
  - $y_{2,1}^{rb}$ : between pose  $x_2$  and landmark  $\ell_1$
- Odometry measurements  $y_{i,i+1}^o$  between successive poses.
- Loop closure constraint as odometry-like measurement  $y_{0,2}^{lc}$  between pose states  $x_0$  and  $x_2$ .

