ELL 770 – Power System Analysis
Assignment 7

1. For the system shown in Fig. 1 with data given in Table 1, the following measurements are obtained:

$V_2 = 1.04$ $\quad P_{G_3} = 0.14$

$V_3 = 0.98$ $\quad P_{12} = 0.12$

$P_{G_1} = 0.58$ $\quad P_{32} = -0.04$

$P_{G_2} = 0.3$ $\quad P_{13} = 0.1$

The measurement variances are given as:

$\sigma_v^2 = (0.01)^2$ $\quad \sigma_{PG}^2 = (0.015)^2$ $\quad \sigma_{P_{ij}}^2 = (0.02)^2$

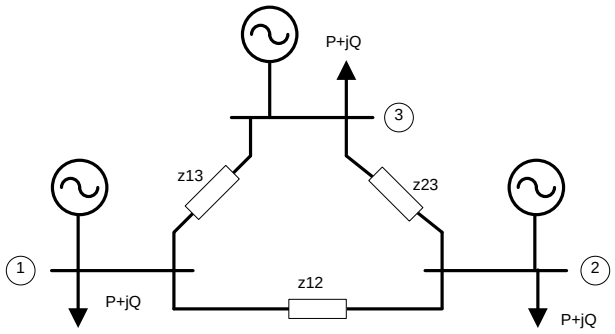

Figure 1

Table 1: 3 bus system data

Line	R	X	B
1-2	0.01	0.1	0.050
1-3	0.05	0.1	0.025
2-3	0.05	0.1	0.025
Bus	$\lvert V \rvert$	P_L	Q_L
1	1.00	0.35	0.10
2	1.02	0.40	0.25
3	1.02	0.25	0.10

Estimate the system states, the error and test for bad data using the χ^2 data with a significance level of 0.01.

Deadline of submission: 5th January 2021

Mode of Submission: Submit on MS Teams.