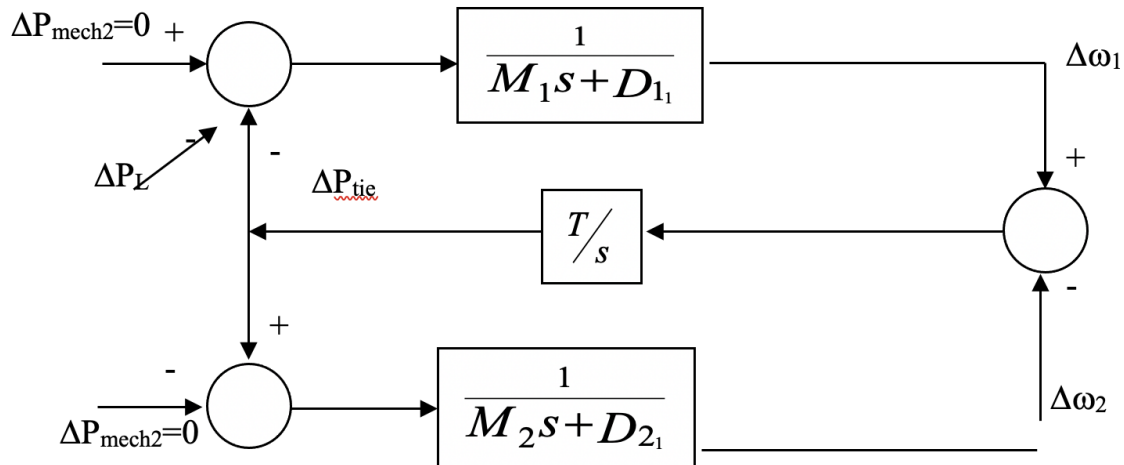


SOAL UJIAN AKHIR SEMESTER
ANALISIS PENGOPERASIAN SISTEM TENAGA
SIFAT UJIAN : BUKA BUKU (DARING)
DOSEN : HERRI GUSMEDI
TANGGAL : 14 JULI 2021

1. Blok diagram di bawah ini merupakan interkoneksi antar 2 system.



a. Tentukan Fungsi transfer $\Delta\omega_1(s)$ dan $\Delta\omega_2(s)$ terhadap perubahan beban $\Delta P_L(s)$. (bobot 10%)

b. Jika nilai :

$M_1 = 3,5 \text{ pu}$ $D_1 = 1,00$

$M_2 = 4,0 \text{ pu}$ $D_2 = 0,75$

$T = 377 \times 0.02 = 7,54 \text{ pu}$

Hitung frekuensi akhir untuk perubahan beban di area 1 sebesar 0.2 pu ? (Gunakan MVA base = 1000 MVA) ...**(bobot 15 %)**

2. Pada Aliran oneline diagram di bawah ini,. Hitung aliran daya di semua saluran jika terjadi outage pada saluran 4-5 dengan menggunakan :

a. Aplikasi Power flow (bobot 25 %)

b. Menggunakan Line outage Distribution factors (LODF) ... periksa adakah saluran yang overload ! (bobot 25%)

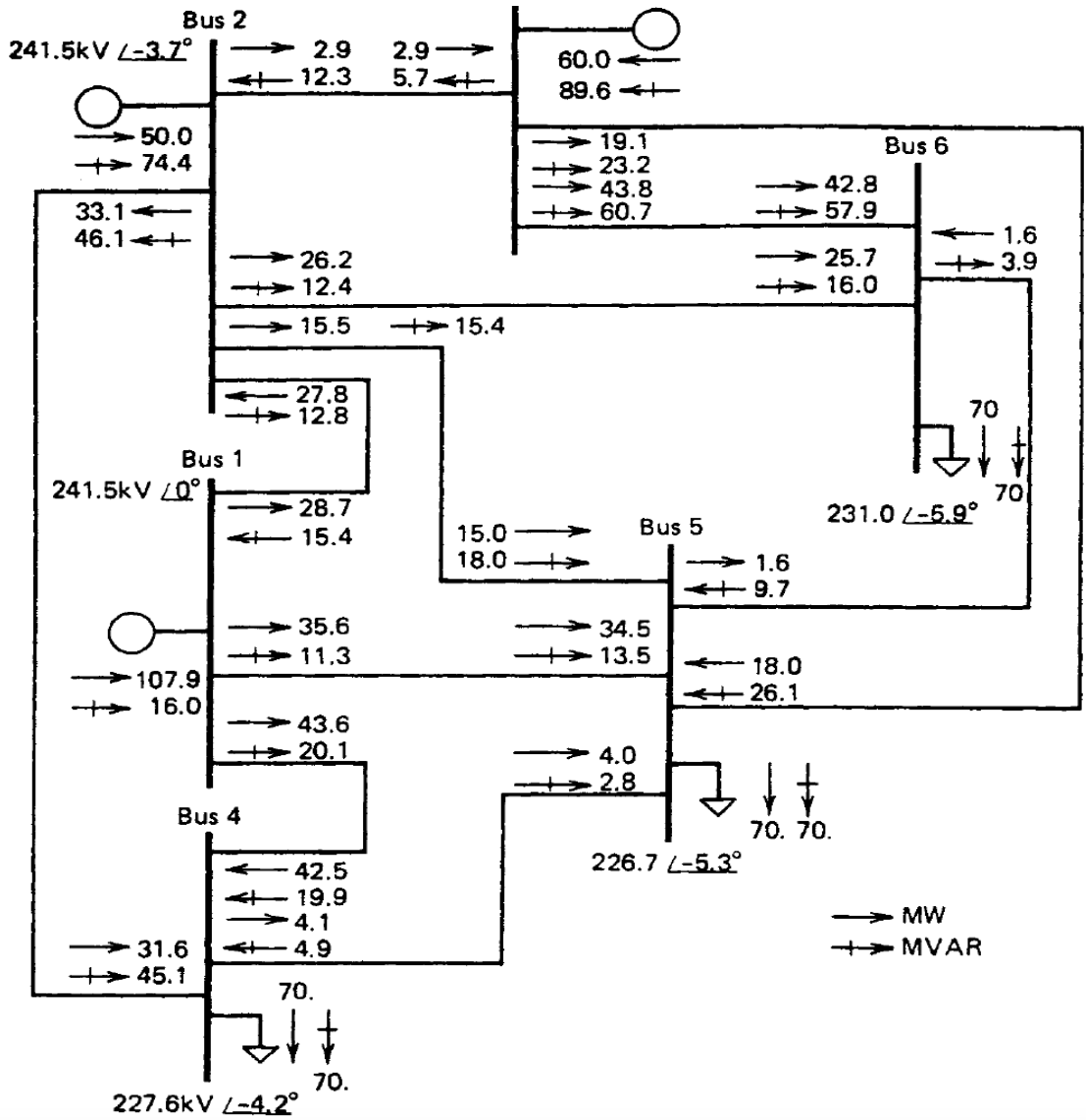
3. Hitung semua aliran daya setelah terjadi gangguan Gen 1 outage ! (periksa adakah saluran yang overload)(bobot 25 %)

Generation Shift Factors For Six-Bus Sample System

	Bus 1	Bus 2	Bus 3
$\ell = 1$ (line 1-2)	0	-0.47	-0.40
$\ell = 2$ (line 1-4)	0	-0.31	-0.29
$\ell = 3$ (line 1-5)	0	-0.21	-0.30
$\ell = 4$ (line 2-3)	0	0.05	-0.34
$\ell = 5$ (line 2-4)	0	0.31	0.22
$\ell = 6$ (line 2-5)	0	0.10	-0.03
$\ell = 7$ (line 2-6)	0	0.06	-0.24
$\ell = 8$ (line 3-5)	0	0.06	0.29
$\ell = 9$ (line 3-6)	0	-0.01	0.37
$\ell = 10$ (line 4-5)	0	0	-0.08
$\ell = 11$ (line 5-6)	0	-0.06	-0.13

Line Outage Distribution Factors for Six-Bus Sample System

	k=1 (Line 1-2)	k=2 (Line 1-4)	k=3 (Line 1-5)	k=4 (Line 2-3)	k=5 (Line 2-4)	k=6 (Line 2-5)	k=7 (Line 2-6)	k=8 (Line 3-5)	k=9 (Line 3-6)	k=10 (Line 4-5)	k=11 (Line 5-6)
$\ell = 1$ (line 1-2)		0.64	0.54	-0.11	-0.50	-0.21	-0.12	-0.14	0.01	0.01	0.13
$\ell = 2$ (line 1-4)	0.59		0.46	-0.03	0.61	-0.06	-0.04	-0.04	0	-0.33	0.04
$\ell = 3$ (line 1-5)	0.41	0.36		0.15	-0.11	0.27	0.16	0.18	-0.02	0.32	-0.17
$\ell = 4$ (line 2-3)	-0.10	-0.03	0.18		0.12	0.23	0.47	-0.40	-0.53	0.17	0.13
$\ell = 5$ (line 2-4)	-0.59	0.76	-0.17	0.16		0.30	0.17	0.19	-0.02	-0.67	-0.19
$\ell = 6$ (line 2-5)	-0.19	-0.06	0.33	0.22	0.23		0.24	0.27	-0.03	0.31	-0.26
$\ell = 7$ (line 2-6)	-0.12	-0.04	0.21	0.51	0.15	0.27		-0.20	0.58	0.20	0.44
$\ell = 8$ (line 3-5)	-0.12	-0.04	0.20	-0.38	0.14	0.27	-0.17		0.47	0.19	-0.42
$\ell = 9$ (line 3-6)	0.01	0	-0.03	-0.62	-0.02	-0.03	0.64	0.60		-0.02	0.56
$\ell = 10$ (line 4-5)	0.01	-0.24	0.29	0.13	-0.39	0.24	0.14	0.15	-0.02		-0.15
$\ell = 11$ (line 5-6)	0.11	0.03	-0.18	0.12	-0.13	-0.23	0.36	-0.40	0.42	-0.18	



Line Data

From bus	To bus	R(pu)	X(pu)	BCAP ^a (pu)
1	2	0.10	0.20	0.02
1	4	0.05	0.20	0.02
1	5	0.08	0.30	0.03
2	3	0.05	0.25	0.03
2	4	0.05	0.10	0.01
2	5	0.10	0.30	0.02
2	6	0.07	0.20	0.025
3	5	0.12	0.26	0.025
3	6	0.02	0.10	0.01
4	5	0.20	0.40	0.04
5	6	0.10	0.30	0.03

^a BCAP = half total line charging susceptance.

Bus Data

Bus number	Bus type	Voltage schedule (pu V)	P_{gen} (pu MW)	P_{load} (pu MW)	Q_{load} (pu MVAR)
1	Swing	1.05			
2	Gen.	1.05	0.50	0.0	0.0
3	Gen.	1.07	0.60	0.0	0.0
4	Load		0.0	0.7	0.7
5	Load		0.0	0.7	0.7
6	Load		0.0	0.7	0.7

Bus	Bus	Pmax (MW)
1	2	50
1	4	100
1	5	80
2	3	50
2	4	80
2	5	40
2	6	80
3	5	25
3	6	50
4	5	25
5	6	20