ELEKTR TARMOKLARI O`TKINCHI XOLATLARINI SIMULINK TIZIMIDA XISOBLASH

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Kirish. “Elektr tarmoqlari o`tkinchi xolatlarini Simulink tizimida xisoblash”. Ushbu ishda Simulink paketidan foydalangan holda elektr ta'minoti tizimlarini modellashtirish asoslarini taqdim etadi MATLAB dasturi. Simulink to'plami MATLAB dasturining juda mustaqil ilovasi bo'lib, u bilan ishlashda umuman dasturlash tillarini bilish shart emas. Bu ishni juda osonlashtiradi vaziyatlarni va mumkin bo'lgan ish rejimlarini modellashtirish ustida ishlash elektr ta'minoti tizimlarini ko`rsatadi, ammo ishonchli natijalarga erishish uchun u modellashtirmoqchi bo'lgan jarayonlar fizikasini aniq tushunish va umuman olganda, ular haqida tasavvurga ega bo'lish kerak. Tegishli elementlardan monitor ekranida kerakli virtual elektr zanjirini yaratib, uni bajarishingiz mumkin uni barqaror holat va vaqtinchalik sharoitlarda o'rganish uchun to'liq tahlil qilish. Shu bilan birga, sxemani to'g'ri yig'ish bilan tadqiqot natijalari real sxemadagi tadqiqotlar natijalariga to'g'ri keladi. Simulyatsiya modellashtirish ba'zan bir qator laboratoriya ishlarini bajarish uchun mo'ljallangan ba'zi zamonaviy ko'p maqsadli laboratoriya stendlarida ishlashdan ko'ra yanada aniqroq va aniqroq bo'lishi mumkin.

Tadqiqot obyekti va predmeti: Elektr tarmoqlari o`tkinchi xolatlarini Simulink tizimida xisoblash.

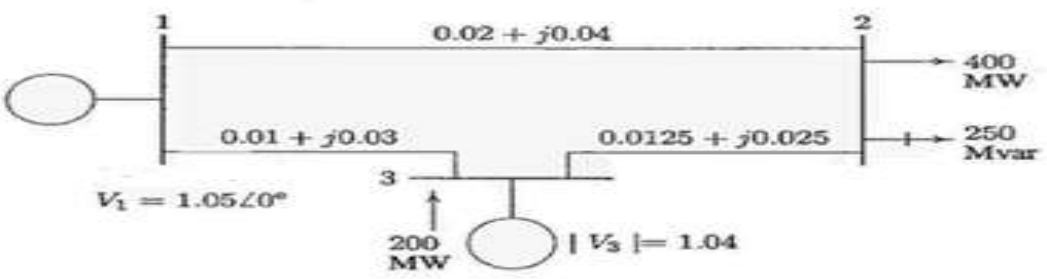
Ishning maqsadi: Ushbu ishining maqsadi stansiyalar berilgan sharoitda ishlaganda ular orasidagi aloqalarni aks ettiruvchi model yaratishdir.

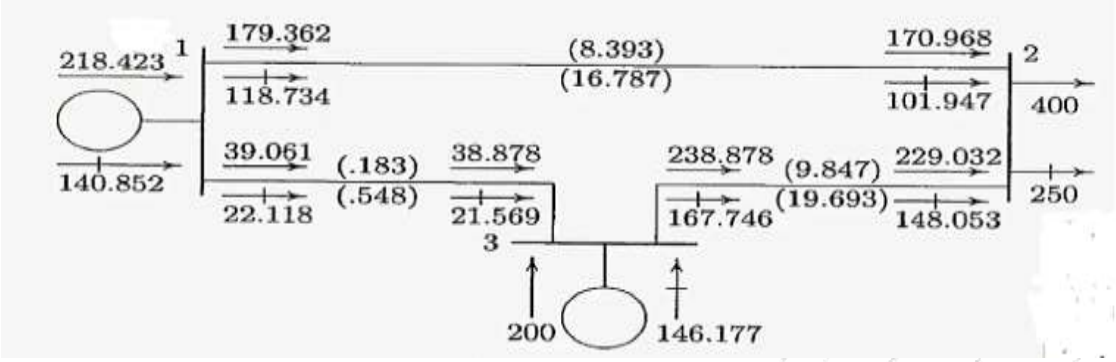
Vazifalar:

1) Model yaratish uchun zarur bo'lgan dastlabki ma'lumotlarni to'plash va tahlil qilish.
2) MATLAB SIMULINK da turli komponentlarni ishlab chiqish
3)Umumiy MATLAB SIMULINK modelini ishlab chiqish
4) Modelning adekvatligi va to'g'riligini baholash
5) Har xil ish rejimlarini simulyatsiya qilish

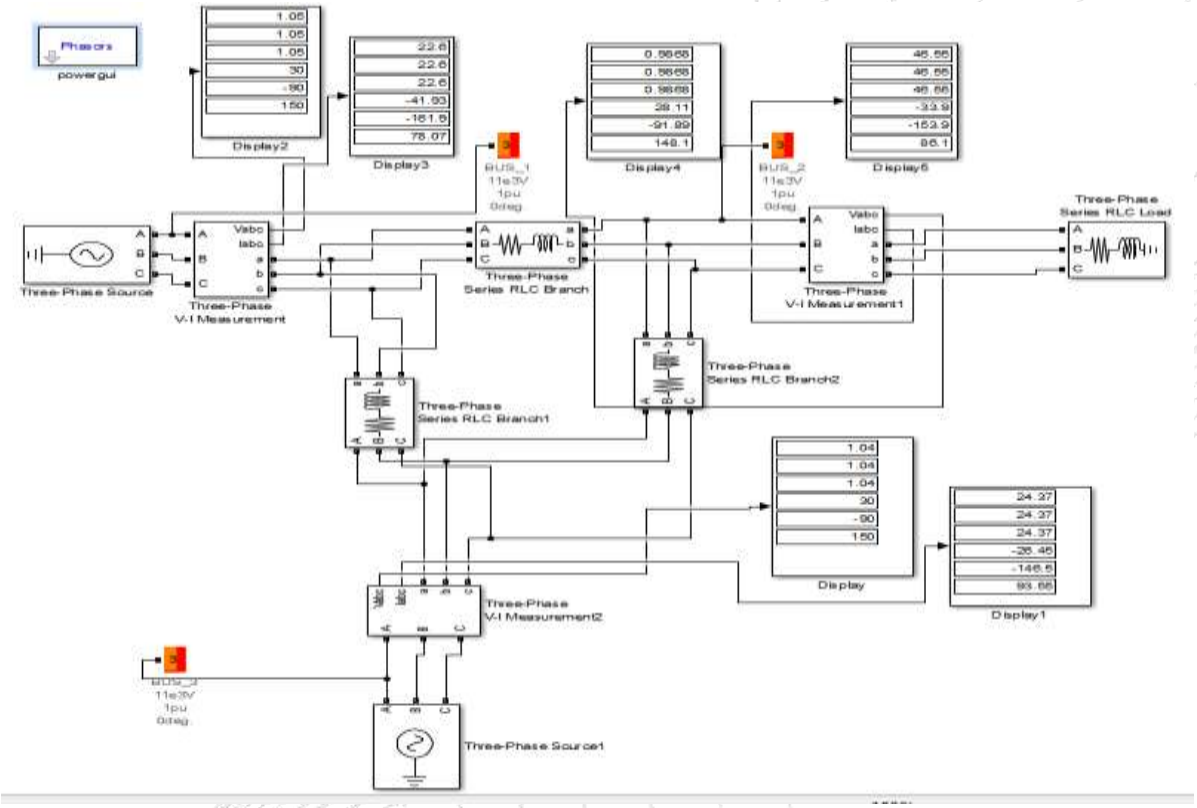
Ilmiy yangiligi: Tizimning ishlashini tavsiflovchi modelni yaratishdadir, bu esa turli xil ish rejimlarini o'rganish imkonini beradi. Elektr tarmoqlari uchun ishlash printsipi bir xil bo'lganligi sababli, bu ish modeldagi kerakli xususiyatlarni va dastlabki parametrlarni o'zgartirish orqali boshqa elektr tarmoqlari uchun ishlatilishi mumkin.

Qisqa tutashuv rejimi va himoya ishga tushganda qisqa tutashuvdan keyingi rejim kurib chiqamiz

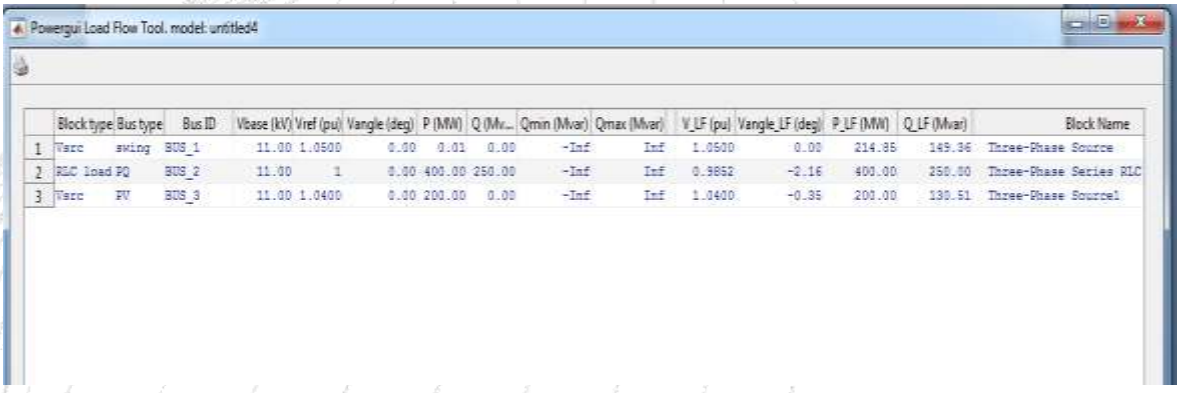




Sxemani yig`ilgandandan kein kurinishda ega buladi



Simulyatsiyani ishga tushirgandan so'ng, biz natijalarni normal rejimda olamiz.



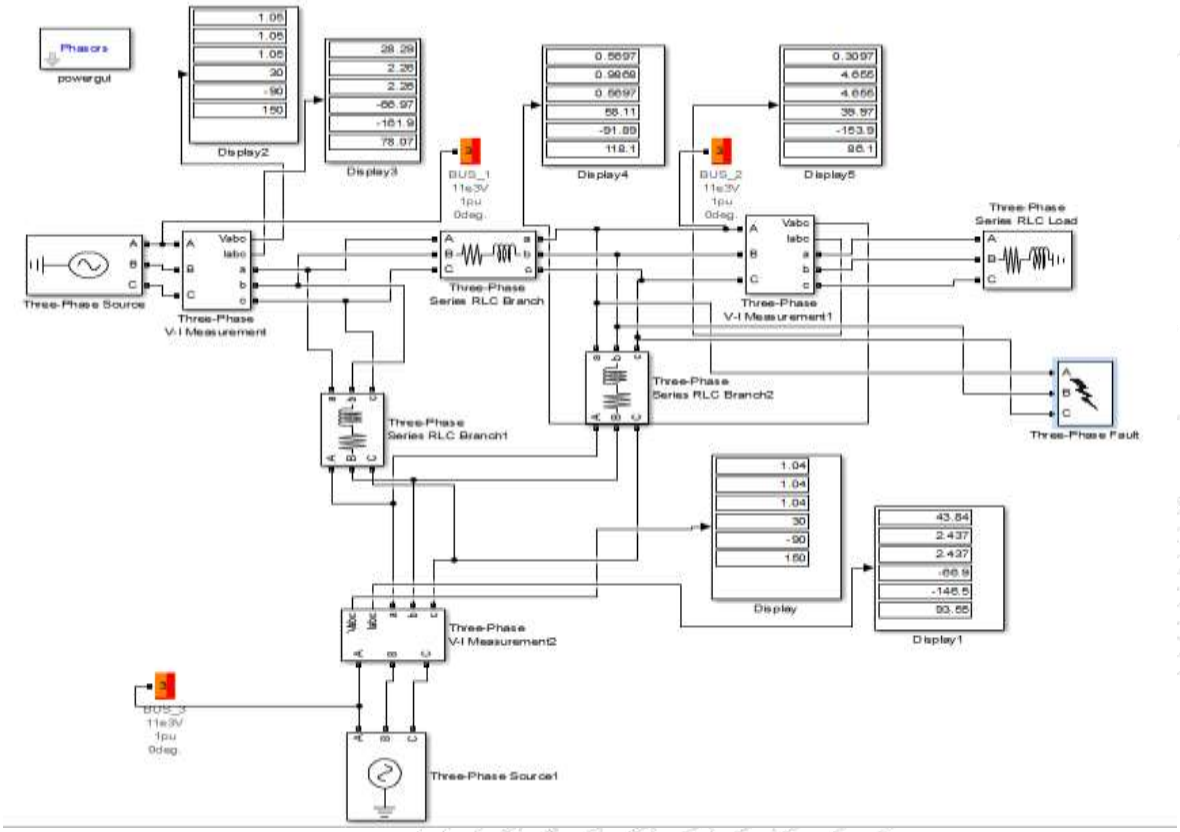
1 tugun kuchlanishi 1,05, faol quvvat P (MW) 214,85, reaktiv quvvat Q (MVar) 149,36 siljish burchagi 0 daraja.

2 tugun kuchlanishi 0,98, faol quvvat P (MW) 400, reaktiv quvvat Q (MVar) 250 o'tish burchagi -2,16 daraja.

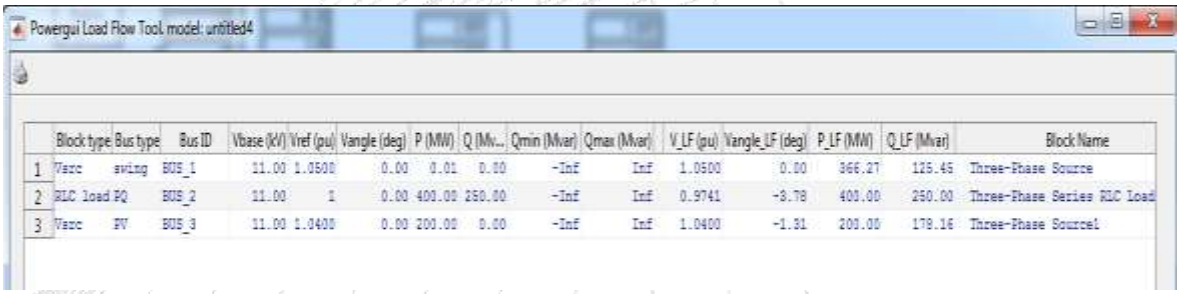
3 tugun kuchlanishi 1,04, faol quvvat P (MW) 200, reaktiv quvvat Q (MVar) 130,6 o'zgarish burchagi 0,35 daraja.

Natijalarni mos kelyadi shunday qilib, model to'g'ri yig'ilgan va to`g`ri ishlaydi.

Biz MALAB SIMULINK dasturida A fazasining erga qisqa tutashuvi rejimida model yaratamiz, qisqa tutashuv blokini qo'shamiz.



Simulyatsiyadan so'ng biz A fazasida qisqa tutashuv rejimida natijalarini olamiz.



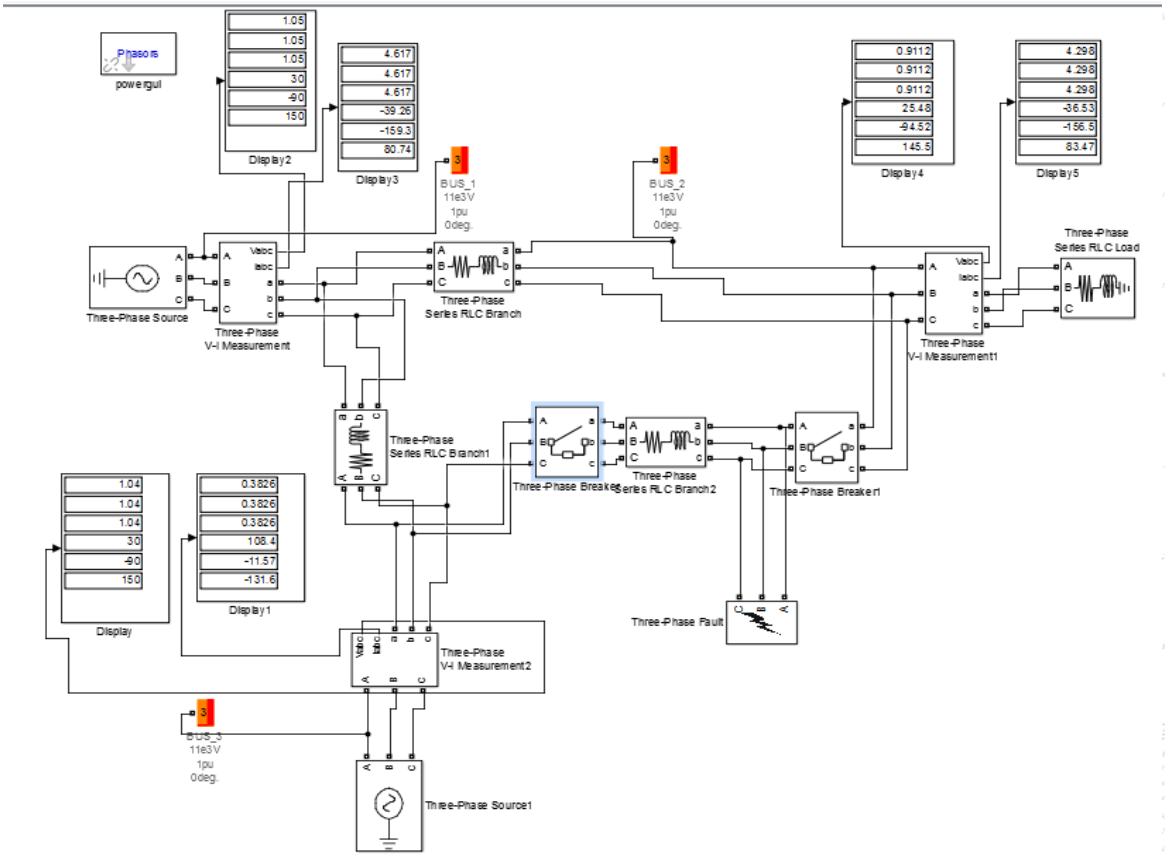
	Block type	Bus type	Bus ID	Vbase (kV)	Vref (pu)	Vangle (deg)	P (MW)	Q (Mv...	Qmin (Mvar)	Qmax (Mvar)	V_LF (pu)	Vangle_LF (deg)	P_LF (MW)	Q_LF (Mvar)	Block Name
1	Vsrc	swing	BUS_1	11.00	1.0500	0.00	0.01	0.00	-Inf	Inf	1.0500	0.00	366.27	125.45	Three-Phase Source
2	RLC load	PQ	BUS_2	11.00	1	0.00	400.00	250.00	-Inf	Inf	0.9741	-3.78	400.00	250.00	Three-Phase Series RLC Load
3	Vsrc	PV	BUS_3	11.00	1.0400	0.00	200.00	0.00	-Inf	Inf	1.0400	-1.31	200.00	178.16	Three-Phase Source1

1 tugun kuchlanishi 1,05, faol quvvat P (MW) 366,27, reaktiv quvvat Q (MVar) 125,45 siljish burchagi 0 daraja.

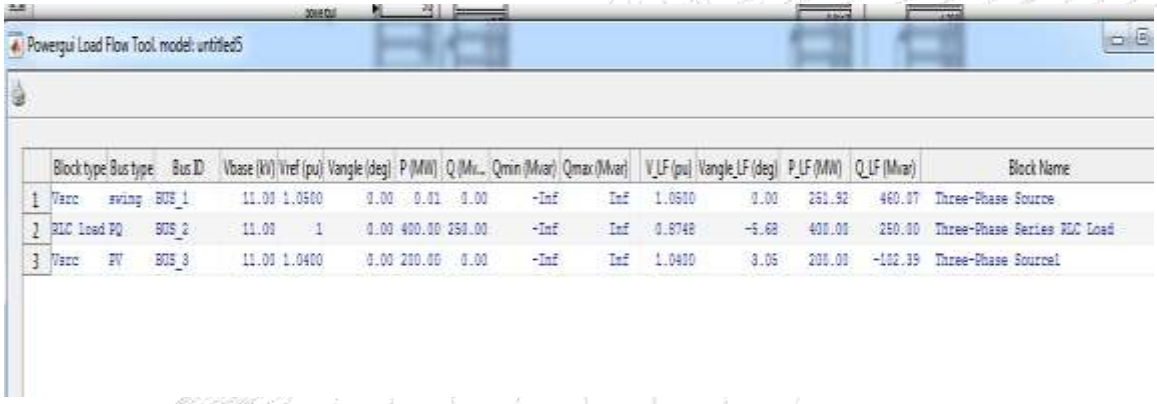
2 tugun kuchlanishi 0,974, faol quvvat P (MW) 400, reaktiv quvvat Q (MVar) 250 o'tish burchagi -3,78 daraja.

3 tugun kuchlanishi 1,04, faol quvvat P (MW) 200, reaktiv quvvat Q (MVar) 178,16 o'zgarish burchagi -1,31 daraja.

Himoya ajratuvchi blokni islaganda rejim



Simulyatsiyadan so'ng biz natijalarni himoya ishlaganda ish rejimini olamiz



	Block type	Bus type	Bus ID	Vbase (kV)	Vref (pu)	Vangle (deg)	P (MW)	Q (Mv...	Qmin (Mvar)	Qmax (Mvar)	V_LF (pu)	Vangle_LF (deg)	P_LF (MW)	Q_LF (Mvar)	Block Name
1	Vsrc	swing	BUS_1	11.00	1.0500	0.00	0.01	0.00	-Inf	Inf	1.0500	0.00	251.92	460.07	Three-Phase Source
2	RLC Load	PQ	BUS_2	11.00	1	0.00	400.00	250.00	-Inf	Inf	0.8748	-5.68	400.00	250.00	Three-Phase Series RLC Load
3	Vsrc	PV	BUS_3	11.00	1.0400	3.05	200.00	0.00	-Inf	Inf	1.0400	3.05	200.00	-102.39	Three-Phase Source1

1 tugun s kuchlanishi 1,05, faol quvvat P (MW) 251,92, reaktiv quvvat Q (MVar) 460,07 siljish burchagi 0 daraja.

2 tugun kuchlanishi 0,87, faol quvvat P (MW) 400, reaktiv quvvat Q (MVar) 250 siljish burchagi -5,68 daraja.

3 tugun kuchlanishi 1,04, faol quvvat P (MW) 200, reaktiv quvvat Q (MVar) -102,39 o'zgarish burchagi 3,05 daraja

Olingan uchta rejimdan biz jadvalni tuzamiz:

	Normal rejimda	A fazasida qisqa tutashuv	Himoya ishlaganda rejim
Tugun 1			
Kuchlanish	**1,05<0**	**1,05<0**	**1,05<0**
Aktiv va reaktiv quvvat (MW va MVar)	**214,85+149,36**	**366,27+125,25**	**251,92+460,07**
Tugun 2			
Kuchlanish	**0,9852<-2.16**	**0.9741<-3.78**	**0.8748<-5.68**
Aktiv va reaktiv quvvat (MW va MVar)	**400+250**	**400+250**	**400+250**
Tugun 3			
Kuchlanish	**1.04<-0.35**	**1.04<-1.31**	**1.04<3.05**
Aktiv va reaktiv quvvat (MW va MVar)	**200+130.51**	**200+178.16**	**200-102.39**

Xulosa. Bu ish tartibi elektr qurilmalarining normal ishlashini buzish tufayli jiddiy oqibatlarga olib kelishi mumkin. Murakkab turdagi shikastlanishlarni tahlil qilish uchun

Simulink ilovasidan foydalanish katta qiziqish uyg'otadi, masalan, faza etishmovchiligi bilan bir vaqtning o'zida koproq buzilishi sodir bo'lishi mumkin, shikastlangan fazaning elektr sig'imi ortadi va shu bilan nesimmetriya paydo bo'lishi uchun sharoit yaratadi.

Bunday vaziyatlarni hisoblashning analitik usuli katta qiyinchiliklarni keltirib chiqaradi.

Elektr tizimini tavsiflovchi differensial tenglamalarni echishning raqamli usullari ko'plab omillarni hisobga olish va energiya tizimida sodir bo'ladigan jarayonlarning aniq tasavvurini shakllantirish imkonini beradi.

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