

# 1<sup>st</sup> APTECS 2009

NATIONAL SEMINAR ON APPLIED TECHNOLOGY, SCIENCE, AND ARTS



## THE PROCEEDING

Surabaya, Dec. 22, 2009



LEMBAGA PENELITIAN DAN  
PENGABDIAN KEPADA  
MASYARAKAT

FIND-11

IPTEK

The Journal for Technology and Science



PROCEEDING

**NATIONAL SEMINAR  
ON “APPLIED TECHNOLOGY, SCIENCE AND ARTS”  
1<sup>st</sup> APTECS 2009**

THEME

**KEUNGGULAN PENGELOLAAN SUMBER-  
SUMBER ENERGI DALAM MENGHADAPI  
KRISIS SOSIAL-EKONOMI GLOBAL**

**Graha Sepuluh Nopember, 22 Desember 2009**

**Organized by:**

**LEMBAGA PENGABDIAN PADA MASYARAKAT (LPPM)  
INSTITUT TEKNOLOGI SEPULUH NOPEMBER  
2009**

# **PROCEEDING OF NATIONAL SEMINAR ON APPLIED TECHNOLOGY, SCIENCE, AND ARTS 1<sup>st</sup> APTECS 2009**

**Edited by APTECS TEAM**

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# NATIONAL SEMINAR ON APPLIED TECHNOLOGY, SCIENCE, AND ARTS 2009

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# SAMBUTAN REKTOR ITS

Assalamu'alaikum Wr. Wb. Salam sejahtera bagi kita semua, semoga Allah SWT selalu melimpahkan rahmat dan karuniaNya kepada kita sekalian. Saya mengucapkan selamat datang untuk peserta *National Seminar on Applied Technology, Science and Arts (APTECS)* yang telah datang dari dalam maupun luar negeri. Seminar ini merupakan forum komunikasi ilmiah dalam rangka *sharing* ilmu pengetahuan, teknologi dan seni.

Sebagai komponen bangsa, Institut Teknologi Sepuluh Nopember (ITS) ikut menyelesaikan permasalahan bangsa yang menyangkut krisis sosial dan ekonomi melalui pengelolaan sumber-sumber energi yang tepat dan terarah yang merupakan topik APTECS kali ini. Topik APTECS yang pertama ini bersesuaian (*selaras*) dengan 3 (tiga) unggulan penelitian di ITS yaitu, Energi, Permukiman, dan Kelautan.

Energi merupakan salah satu daya dukung penguatan sektor ekonomi dan pembangunan Indonesia. Krisis di sektor riil dan investasi global berimplikasi signifikan pada daya dukung tersebut, dan berdampak pada penurunan kemampuan pemenuhan kebutuhan dasar masyarakat (sandang, papan, dan pangan). Oleh karena itu melalui APTECS yang pertama ini ITS menggagas tentang kesinergian yang berkesinambungan di bidang teknologi, sosial dan ekonomi dalam upaya menghadapi krisis tersebut secara regional maupun global, sehingga pemecahan dan tanggung jawabnya tidak terpisah hanya di satu negara saja, namun menjadi tanggungjawab semua negara. Bentuk sumbangsih ini akan dipresentasikan dalam bentuk diskusi ilmiah yang merangkai berbagai disiplin ilmu di seminar ini.

Dalam kesempatan ini ITS berterima-kasih kesemua pihak (LPPM-ITS, Panitia APTECS, peserta seminar dan semua pihak yang mendukung acara ini). Akhir kata, kami mengucapkan selamat berseminar semoga sukses dan sampai jumpa tahun depan pada 2nd APTECS 2010.

Surabaya, 22 Desember 2009  
Rektor ITS

**PROF. PRIYO SUPROBO**

# SAMBUTAN KETUA LPPM ITS

Puji syukur patut kita panjatkan kehadapan Tuhan Yang Maha Esa, yang dengan karunia dan rahmatNya APTECS dapat berjalan dengan baik. Dua ratus enam puluh paper ilmiah terpilih akan dipresentasikan, dan lebih dari 400 peneliti, industriawan, dan akademisi dari dalam negeri dan luar negeri akan hadir untuk menyampaikan ide dan kontribusinya terhadap perkembangan Ilmu Pengetahuan, Teknologi, dan Seni untuk kemaslahatan umat manusia. Prestasi ini patut disyukuri dan dengan usaha yang keras penyelenggara, dan ada kebangkitan kesadaran dari para peneliti selaku *Core Creative Community* untuk terus berpartisipasi atmosfir akademika ini.

Seminar ini diselenggarakan oleh LPPM-ITS dalam rangka Dies Natalis ITS yang ke 49 dan menunjang program FIND-11, dan juga dalam rangka membangun jaring dan komunikasi antar peneliti, pelaku industri, dan akademisi di tingkat nasional maupun internasional. Karena salah satu bidang unggulan yang dikembangkan ITS adalah bidang *Energi, pemukiman, dan kelautan*, maka seminar yang pertama ini mengambil tema *Keunggulan Pengelolaan Sumber-sumber Energi dalam Menghadapi Krisis Sosial-Ekonomi Global*.

Sumber daya alam dan sumber daya manusia yang banyak sudah tidak dapat dijadikan modal utama dalam menghadapi persaingan global, tetapi yang sekarang lebih dibutuhkan adalah modal *Ilmu Pengetahuan, Teknologi dan Kreativitas*. Tanpa memiliki tiga modal tersebut maka akan terjadi paradok-paradok yang negatif pada kehidupan yaitu: negara yang berlimpah sumber daya alam, tetapi rakyatnya miskin dan negara dengan banyak sumber daya manusia tetapi menghasilkan nilai tambah yang sangat kecil pada perekonomian dunia. Dalam rangka menguatkan modal Ilmu Pengetahuan, Teknologi dan membangun masyarakat yang kreatif maka LPPM-ITS menyelenggarakan APTECS ini yang akan dikembangkan setiap tahun, dan akan menjadi seminar Internasional di tahun yang akan datang, sehingga dapat menghimpun peneliti-peneliti dunia yang berkualitas dalam mencari pemecahan berbagai persoalan kehidupan umat manusia.

Dalam kesempatan yang berbahagia ini, LPPM-ITS selaku penyelenggara menyampaikan rasa banyak terimakasih dan menyampaikan rasa salut dan berbangga kepada para peneliti yang berpartisipasi. Terimakasih yang sangat dalam juga kami sampaikan kepada pimpinan ITS yang telah mendukung sepenuhnya seminar ini. LPPM-ITS juga merasa patut untuk memberi penghargaan yang tinggi kepada panitia pelaksana yang telah bekerja keras dan cerdas dalam menyiapkan APTECS ini.

LPPM-ITS mengucapkan selamat berpartisipasi dalam seminar, dan teruslah berkarya dan meneliti semoga Tuhan selalu melimpahkan karunia-Nya, sehingga kontribusi yang diberikan oleh para peneliti dapat bermakna untuk kemakmuran, kesejahteraan, dan kemaslahatan umat manusia.

Surabaya, 22 Desember 2009  
Ketua LPPM-ITS

**PROF. I NYOMAN SUTANTRA**

# Welcome to APTECS 2009

Assalamu'alaykum warohmatullaahi wabarokatuh

Selamat datang kepada para peserta 1<sup>st</sup> APTECS, dan semoga Saudara dalam satu hari ini dapat menikmati suasana harmonis di seminar ini dan dapat menikmati keindahan kampus ITS.

Seminar yang dilaksanakan dalam rangka memperingati Dies Natalis ITS ke 49 dan kerjasama FIND-11, sebagai perwujudan dari ajang komunitas para peneliti dan pengkaji bidang Iptek, sosial dan seni yang mengambil tema tahun 2009 "*Keunggulan Pengelolaan Sumber-sumber Energi dalam Menghadapi Krisis Sosial Ekonomi Global*". Di samping tema utama tersebut, beberapa hal yang berhubungan bidang aplikasi teknologi, aplikasi pada sistem pendidikan, aplikasi ICT pada sistem pendidikan, energi dibarukan, efisiensi energi, dan restrukturisasi energi, elektrik, elektronik, bioteknologi, komunikasi dan game technology, transportasi, kebumihan dan kebencanaan, manufaktur, material dan proses industri, dan kelautan (biologi laut, bangunan laut dan kepepesisiran). Untuk bidang science terdiri dari ilmu sosial dan humaniora, rekayasa sosial, nano science, medical, medicine, pemodelan, komputasi, dan kecerdasan tiruan, nuclear science, seni dan industri kreatif, pendidikan secara umum, pertanian dan kehutanan. Dalam seminar ini akan dilakukan diskusi secara sinergi antara peneliti, praktisi, dan juga dapat diambil sebagai pijakan dalam pengambilan keputusan oleh para pejabat pengambil keputusan, dan juga akan dipresentasikan hasil karya seni anak bangsa sebagai usaha untuk mengangkat karya seni domestik sebagai karya internasional.

Pada kesempatan ini kami menyampaikan rasa terima kasih kepada Rektor ITS yang memberi semangat dan fasilitas dalam penyelenggaraan APTECS ini, Kepada Ketua LPPM ITS dan keluarga besar LPPM ITS yang sangat mensupport dan mengawal acara ini hingga sukses, dan Kepada seluruh civitas akademika ITS. Kepada para sponsorship yang ikut berpartisipasi dalam menyukseskan acara ini kami menyampaikan rasa terima kasih, semoga kerjasama ini dapat terjalin dengan lebih hangat lagi di waktu yang akan datang. Kepada rekan-rekan panitia, Dr. Aulia, Dr Bambang Sampurno, Dr. Heru Mirmanto, Dr. Tavio, Mr. Hendra Cordova, Ms Kamilia, Mr Tamaji, Ms Listiani, Ms Efritra, Ms Febriana, Ms Liza, Ms Erni, Ms Syiska, Mr Phonny Aditiawan, dan yang lain yang tidak dapat saya sebut satu-persatu yang telah bekerja dengan semangat luar biasa dengan penuh keceriaan dan loyalitas. Kepada para profesor yang berada di technical program committee, Prof Gamantyo, Prof. Noor Endah, Prof. Ali Altway, Prof Perry Burhan, Prof. Suprpto, Prof Triwulan, Prof Djatmiko, Prof Djauhar M., Prof Endang, Prof Eko Budi, dan Prof IN Pujawan, kami menghaturkan rasa terima kasih yang sangat tinggi dengan kesediaan mereka untuk meluangkan waktu untuk APTECS. Terima kasih kepada Tim Gamelan dari Elektro Budoyo Group pimpinan Pak Joko Susila (Jurusan Teknik Elektro ITS), Tim Tari Ngremo Kolosal pimpinan Pak Solihin Fanani (dari SDM 4 Pucang Surabaya), dan Tari Kiprah Glipang pimpinan Pak Boediono dari PDM Probolinggo yang telah menyumbangkan karya kreativitasnya, semoga dapat menjadi titik tonggak awal kebangkitan kreativitas karya seni Indonesia yang selalu digemari oleh putra-putri Indonesia.

Our special thanksfull to Professor HIYAMA Takashi from Kumamoto Univ., Japan, as Keynote Speaker in this event, and welcome to Surabaya.

Mohon maaf dengan segala kekurangan, dan sampai jumpa di International APTECS, 21 Desember 2010 yang akan datang.

Assalamu'alaykum warohmatullaahi wabarokatuh

General Chair of 1<sup>st</sup> APTECS 2009

**PROF. IMAM ROBANDI**

# **UCAPAN TERIMA KASIH KEPADA**

**REKTOR ITS**

**LPPM ITS**

**REDAKSI MAJALAH IPTEK ITS**

**KUMAMOTO UNIVERSITY, JAPAN**

**UNIVERSITAS MUHAMMADIYAH SURABAYA**

**INSTITUT TEKNOLOGI ADHI TAMA SURABAYA**

**SMP MUHAMMADIYAH 5 SURABAYA**

**SD MUHAMMADIYAH 4 SURABAYA**

**SD MUHAMMADIYAH 26 SURABAYA**

**PT. TIRA AUSTENITE, TBK**

**RAJANT CORPORATION**

**LABORATORIUM UJI MATERIAL-D3 T. SIPIL ITS**



**SCHEDULE**  
**NATIONAL SEMINAR ON APPLIED TECHNOLOGY, SCIENCE, AND ARTS**  
**1<sup>st</sup> APTECS 2009**

<b>6.40 – 7.40 Registrasi</b>										
<b>7.40-8.19 Banjaran Srepeg oleh <i>Elektro Budoyo</i></b>										
<b>08.19 – 08.26 MC</b>										
<b>08.26 – 08.33 Ngremo Kolosal oleh <i>SD Muhammadiyah 4 Surabaya &amp; Elektro Budoyo</i></b>										
<b>08.33 – 08.43 Welcome to APTECS oleh <i>Prof. IMAM ROBANDI</i></b>										
<b>08.43 – 08.50 Musik dan Tari Kiprah Glipang oleh <i>Lembaga Seni dan Budaya PDM Probolinggo</i></b>										
<b>08.50 – 09.00 Sambutan oleh <i>Prof. I NYOMAN SUTANTRA (Ka LPPM ITS)</i></b>										
<b>09.00 – 09.08 Gending Ladrang APTECS oleh <i>Elektro Budoyo</i></b>										
<b>09.08 – 09.28 Opening Term oleh <i>Prof. PRIYO SUPROBO (Rektor ITS)</i></b>										
<b>09.28 – 09.34 Ladrang Parisuko oleh <i>Elektro Budoyo</i></b>										
<b>09.34 – 09.40 Launching Buku oleh <i>Prof. ARIF DJUNAIDY (Pembantu Rektor I ITS)</i></b>										
<b>09.40 – 10.50 Keynote Speech oleh <i>Prof. HIYAMA TAKASHI (Kumamoto University, Japan)</i></b>										
	A	B	C	D	E	F	G	H	I	J
11.00-11.12	ENG-92	ENG-248	ENG-88	MED-13	ENG-219	ENG-245	MED-19	ENG-90	ENG-139	ENG-223
11.12-11.24	ENG-225	SOC-7	ENG-22	ENG-108	ENG-75	ENG-109	SOC-14	ENG-198	ENG-18	ENG-224
11.24-11.36	ENG-134	ENG-40	ENG-144	ENG-85	ENG-77	ENG-129	ENG-233	ENG-199	AGR-4	ENG-201
11.36-11.48	ENG-241	SOC-8	ENG-54	ENG-7	ENG-89	ENG-149	ENG-231	ENG-200	ENG-24	ENG-230
11.48-12.00	ENG-74	ENG-73	ENG-138	ENG-32	ENG-257	ENG-96	AGR-6	ENG-181	ENG-45	ENG-91
12.00-13.00	Break for Lunch									
13.00-13.12	ENG-168	ENG-235	ENG-169	SOC-17	MED-9	ENG-98	ENG-161	ENG-147	ENG-57	ENG-27
13.12-13.24	ENG-171	ENG-172	ENG-124	MED-18	ENG-97	ENG-185	ENG-125	ENG-13	ENG-46	ENG-227
13.24-13.36	ENG-113	ENG-173	ENG-2	ENG-38	ENG-135	ENG-5	MED-20	MED-12	ENG-33	ENG-213
13.36-13.48	ENG-8	ENG-48	ENG-4	ENG-105	ENG-162	ENG-10	ENG-99	ENG-60	ENG-141	ENG-202
13.48-14.00	ENG-86	ENG-21	ENG-115	MED-6	MED-10	ENG-12	ENG-103	ENG-17	ENG-36	ENG-140
14.00-14.12	ENG-87	ENG-132	ENG-55	MED-4	MED-2	ENG-102	ENG-9	ENG-53	ENG-83	MED-17
14.12-14.24	EDU-6	ENG-50	ENG-31	MED-1	ENG-14	ENG-214	ENG-69	MED-8	ENG-68	ENG-165
14.24-14.36	ENG-210	ENG-62	ENG-35	EDU-7	ENG-133	ENG-15	ENG-218	ENG-142	AGR-7	ENG-94
14.36-14.48	ENG-209	SOC-9	ENG-29	ENG-206	ENG-104	ENG-19	MED-5	ENG-64	ENG-112	ENG-146
14.48-15.00	ENG-76	SOC-6	ENG-28	ENG-184	ENG-39	ENG-23	ENG-95	ENG-84	ENG-63	ENG-258
15.00-15.12	ENG-58	ENG-67	ENG-151	SOC-4	ENG-81	ENG-25	ENG-93	ENG-195	ENG-72	ENG-49
15.12-15.24	ENG-79	ENG-6	AGR-8	ENG-56	ENG-42	ENG-187	ENG-59	ENG-107	EDU-4	ENG-80
15.24-15.36	ENG-131	ENG-26	ENG-116	ENG-232	SOC-18	ENG-158	ENG-215	ENG-130	ENG-182	ENG-186
15.36-15.48	ENG-166	ENG-237	SOC-13	ENG-65	ENG-121	ENG-127	ENG-216	ENG-175	ENG-110	ENG-174
15.48-16.00	ENG-128	ENG-164	SOC-12	ENG-34	ENG-156	EDU-1	ENG-137	ENG-119	ENG-37	EDU-2
16.00-16.12	ENG-159	ENG-160	ENG-20	ENG-51	ENG-61	ENG-243	ENG-16	MED-3	ENG-3	ENG-111
16.12-16.24	SOC-10	SOC-5	MED-16	ENG-1	ENG-179	ENG-244	ENG-212	ENG-52	ENG-178	ENG-191
16.24-16.36	ENG-249	ENG-44	ENG-30	ENG-247	MED-21	ENG-192	EDU-5	ENG-177	ENG-193	ENG-228
16.36-16.48	MED-11	ENG-157	ENG-152	ENG-153	ENG-255	ENG-196	ENG-154	SOC-3	EDU-3	ENG-123
16.48-17.00	ENG-71	ENG-194	ENG-203	Eng-208	ENG-253	ENG-211	ENG-220	ENG-197	MED-7	ENG-221
17.00-17.12	ENG-260	ENG-242	ENG-238	ENG-240	ENG-259	SOC-15	SOC-16	ENG-250	SOC-19	ENG-251
17.12-17.24			ENG-254	ENG-252		ENG-183	ENG-246	ENG-256		

- NOTE**
- |                              |                               |
|------------------------------|-------------------------------|
| A : Ruang Argopuro 1 (Lt. 1) | F : Ruang Semeru 2 (Lt. 1)    |
| B : Ruang Argopuro 2 (Lt. 1) | G : Ruang Anjasmoro 1 (Lt. 2) |
| C : Ruang Kawi (Lt. 1)       | H : Ruang Anjasmoro 2 (Lt. 2) |
| D : Ruang Lawu (Lt. 1)       | I : Ruang Anjasmoro 3 (Lt. 2) |
| E : Ruang Semeru 1 (Lt. 1)   | J : Ruang Kelud (Lt. 2)       |

**- 11.32 is time for Dzuhur prayer, 14.58 is time for Ashar prayer.**

**Moderator Sesion 1 (10.00 – 12.00)**

A	Ruang Argopuro 1 (Lt.1)	Prof. Agus Rubiyanto
B	Ruang Argopuro 2 (Lt. 1)	Prof. Djauhar Manfaat
C	Ruang Kawi (Lt. 1)	Prof. Basuki Widodo
D	Ruang Lawu (Lt. 1)	Prof. Djatmiko Ichsani
E	Ruang Semeru 1 (Lt. 1)	Prof. Suprpto
F	Ruang Semeru 2 (Lt. 1)	Prof. Sutardi
G	Ruang Anjasmoro 1 (Lt. 2)	Prof. Paulus Indiyono
H	Ruang Anjasmoro 2 (Lt. 2)	Prof. Noor Endah B. Mochtar
I	Ruang Anjasmoro 3 (Lt. 2)	Prof. Nyoman Pujawan
J	Ruang Kelud (Lt. 2)	Prof. Mauridhi Hery Purnomo

**Moderator Sesion 2 (13.00 – 17.00)**

A	Ruang Argopuro 1 (Lt.1)	Dr. Agus Purwanto
B	Ruang Argopuro 2 (Lt. 1)	Dr. Achmad Arifin
C	Ruang Kawi (Lt. 1)	Dr. Bambang Lelono
D	Ruang Lawu (Lt. 1)	Dr. Sigit Darmawan
E	Ruang Semeru 1 (Lt. 1)	Dr. Endah Wahyuni
F	Ruang Semeru 2 (Lt. 1)	Dr. Djoko Purwanto
G	Ruang Anjasmoro 1 (Lt. 2)	Dr. Ketut Eddy Purnama
H	Ruang Anjasmoro 2 (Lt. 2)	Dr. Surya Rosa Putra
I	Ruang Anjasmoro 3 (Lt. 2)	Dr. Sri Gunani Pertiwi
J	Ruang Kelud (Lt. 2)	Dr. Prabowo

**Aturan Presentasi Seminar**

- a. Waktu presentasi adalah 12 menit/judul termasuk diskusi.
- b. Bel pertama pada menit ke 7, bel kedua pada menit ke 9, sisanya untuk berdiskusi sampai bel ke 3 di menit ke 12.
- c. Presenter dimohon untuk efisien dalam menggunakan waktu.
- d. Time keeper dimohon sangat ketat dalam menjaga waktu

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# Controller Design SMIB By Direct Feedback Linearization

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**Abstract** — Single machine infinite bus is a non linear dynamic system. To design the controller of non linear dynamic system is not easy. Usually, we linearize the system and after that design the controller as linear dynamic system. In this paper, we studied the controller design of single machine infinite bus (SMIB) by using a direct feedback linearization (DFL). This method is different with linearization method by Taylor series approximation. Here, we did simulation by Matlab program. From this simulation, we know that DFL method can be applied to design the controller of SMIB.

**Keywords**—SMIB, DFL, design controller

## 1. Introduction

Controller design is a method to determined of feedback gain such that the system become closed loop system and has the desired pole. Usually, the controller design is done to make the system stable or place the pole in the left half plane. Design controller, usually is applied in the linear dynamic system, so that for non linear dynamic system, we must linearize before we design the controller.

In this paper, we design the controller of power system with single machine infinite bus (SMIB) by using direct feedback linearization (DFL). The DFL method consist of two steps: the first one is compensator linearization of non linear state feedback variable DFL (output) which change the non linear system become linear system with new input, and the second is optimal control design non linear [1]. Before we applied the DFL method, we derive the mathematical model of power system with SMIB.

## 2. Dynamic Model of SMIB

Single machine infinite bus is a simple model of power system [2]. This system consist of single power which connect with two line parallel transmission respect to large networking and approximate by infinite bus. This system is showed in Figure 1.

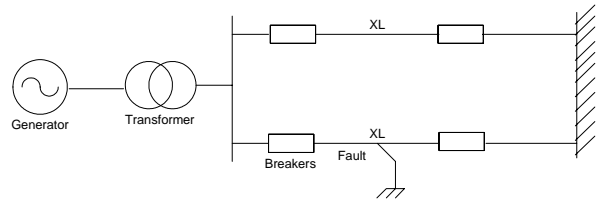


Figure 1. SMIB power system

Mathematical model of this system, consist of mechanic equation, power electric equation and electrical equation. The mathematical model [1] are:  
 Mechanical equation is

$$\dot{\delta} = \omega - \omega_0 \quad (1)$$

$$\dot{\omega} = \frac{\omega_0}{2H} \left[ P_m - \frac{D}{\omega_0} \omega - P_e \right] \quad (2)$$

Electric power dynamic

$$\dot{E}'_q = \frac{1}{T_{d0}} [E_f - E_q] \quad (3)$$

Electrical equation

$$E_q = E'_q + (x_d - x'_d) I_d \quad (4)$$

$$E_f = k_c u \quad (5)$$

$$P_e = \frac{E'_q V_s}{x_{d\varepsilon}} \sin \delta \quad (6)$$

$$I_d = \frac{E'_q - V_s \cos \delta}{x_{d\varepsilon}} = \frac{E'_q - V_s \cos \delta}{x_{d\varepsilon}} \quad (7)$$

$$I_q = \frac{V_s}{x_{d\varepsilon}} \sin \delta \quad (8)$$

$$Q = \frac{E_q' V_s}{x_{d\varepsilon}} \cos \delta - \frac{V_s^2}{x_{d\alpha}} \quad (9)$$

Equation (1) –(8) are SMIB mathematical model. Where  $\delta$  is rotor angel,  $\omega$  is a rotor velocity,  $\omega_0$  reference velocity,  $p_m, p_e$ , is mechanical power input and active power delivery, respectively.  $D$  is a damping power coefficient,  $E_q', E_q, E_f$  is internal transient power,  $x_d', x_d$  is a transient reactance and synchronize transient.  $I_d, I_q$  is stator current in direction d and q,  $k_c, u$  is excitation amplifier from gain and control input.  $V_s, V_l$  is a infinite voltage and power terminal voltage.  $Q$  is a reactive power delivery .

The DFL method is beginning by differentiate the active power delivery  $P_e$  Eq. (6) respect to time, we get

$$\dot{P}_e = \frac{V_s}{x_{d\varepsilon}} \sin \delta \frac{d}{dt} E_q' + \frac{E_q' V_s}{x_{d\varepsilon}} \frac{d}{dt} \sin \delta$$

or

$$\dot{P}_e = \frac{V_s}{x_{d\varepsilon}} \sin \delta \dot{E}_q' + \frac{E_q' V_s}{x_{d\varepsilon}} \cos \delta \dot{\delta} \quad (10)$$

Substitute Eq. (3, 8,9) into Eq. (10), the equation (10) become

$$\dot{P}_e = \frac{I_q}{T_{d0}} [k_c u - E_q' - (x_d - x_d') I_d] + \left( Q + \frac{V_s^2}{x_{d\alpha}} \right) \Delta \omega \quad (11)$$

We arrange Eq. (11), and we get

$$\dot{P}_e = -\frac{I_q}{T_{d0}} E_q' + \frac{I_q}{T_{d0}} [k_c u - (x_d - x_d') I_d] + \frac{T_{d0}}{T_{d0}} \left( Q + \frac{V_s^2}{x_{d\alpha}} \right) \Delta \omega$$

$$\dot{P}_e = -\frac{V_s}{x_{d\varepsilon}} E_q' \sin \delta \frac{1}{T_{d0}} +$$

$$\frac{1}{T_{d0}} \left\{ \frac{T_{d0}}{T_{d0}} I_q [k_c u - (x_d - x_d') I_d] + T_{d0} \left( Q + \frac{V_s^2}{x_{d\alpha}} \right) \Delta \omega \right\}$$

And finally we have

$$\dot{P}_e = -\frac{1}{T_{d0}} (P_e - P_m) + \frac{1}{T_{d0}} \left\{ \frac{T_{d0}}{T_{d0}} I_q [k_c u - (x_d - x_d') I_d] + T_{d0} \left( Q + \frac{V_s^2}{x_{d\alpha}} \right) \Delta \omega - P_m \right\} \quad (12)$$

Define

$$\Delta \delta = \delta - \delta_0 ; \Delta \omega = \omega - \omega_0 ; \Delta P_e = P_e - P_m ,$$

from Eq. (1),(2) and (12) we have the linear dynamic system of SMIB with input  $v_f$  :

$$\begin{aligned} \Delta \dot{\delta} &= \Delta \omega \\ \Delta \dot{\omega} &= \frac{-D}{2H} \Delta \omega - \frac{\omega_0}{2H} \Delta P_e \\ \Delta \dot{P}_e &= \frac{-1}{T_{d0}} \Delta P_e + \frac{1}{T_{d0}} v_f \end{aligned} \quad (13)$$

Where

$$v_f = I_q [k_c u - (x_d - x_d') I_d] + T_{d0} \left( Q + \frac{V_s^2}{x_{d\alpha}} \right) \Delta \omega - P_m$$

Equation (13) can be written as state space system

$$\begin{bmatrix} \Delta \dot{\delta} \\ \Delta \dot{\omega} \\ \Delta \dot{P}_e \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & \frac{-D}{2H} & \frac{-\omega_0}{2H} \\ 0 & 0 & \frac{-1}{T_{d0}} \end{bmatrix} \begin{bmatrix} \Delta \delta \\ \Delta \omega \\ \Delta P_e \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ \frac{1}{T_{d0}} \end{bmatrix} [v_f] \quad (14)$$

Now, the problem is design a controller such that system (14) stable asymptotical.

### 3. Control Design Law DFL

Define an input system [1]:

$$u = \frac{1}{k_c I_q} \left[ v_f - T_{d0} \left( Q + \frac{V_s^2}{x_{d\varepsilon}} \right) \Delta \omega - P_m \right]$$

$$+ \frac{1}{k_c} (x_d - x'_d) I_d \quad (15)$$

for  $I_q \neq 0$  in  $0^0 < \delta < 180^0$ .

In the system Eq.(14)  $\Delta\delta$ ,  $\Delta\omega$ , and  $\Delta P_e$  are desired converge to.

Suppose

$$v_f = [f_1 \quad f_2 \quad f_3] \begin{bmatrix} \Delta\delta \\ \Delta\omega \\ \Delta P_e \end{bmatrix} \quad (16)$$

Where  $F = [f_1, f_2, f_3]$  is feedback gain, then system (14) become

$$\begin{bmatrix} \Delta\dot{\delta} \\ \Delta\dot{\omega} \\ \Delta\dot{P}_e \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & \frac{-D}{2H} & \frac{-\omega_0}{2H} \\ -\frac{1}{T_{do}} f_1 & -\frac{1}{T_{do}} f_2 & \frac{1}{T_{do}} (1 - f_3) \end{bmatrix} \begin{bmatrix} \Delta\delta \\ \Delta\omega \\ \Delta P_e \end{bmatrix} \quad (17)$$

Therefore, we must determine feedback gain  $F = [f_1, f_2, f_3]$  such that system (17) asymptotical stable [3].

Here we use pole assignment method to determine feedback gain F.

After we obtained  $\Delta\delta, \Delta\omega, \Delta P_e$  then we substitute those value in Eq. (16) to get new input  $v_f$ , and then this value is substitute to Eq. (15) to get the real input  $u$ .

#### 4. Simulation Result

To make a simulation, we take the parameter from [3]:

$$x_d = 1.863, x'_d = 0.257, x_t = 0.127, T_{do}' = 6.9, \\ H = 4, D = 5, x_{ad} = 1.712, x_l = 0.4853, k_c = 1, \\ \omega_0 = 314.159$$

For pole placement method, we take some poles and we obtain the feedback gain by using Matlab function (place) [3]. Figure 2. Shows system SMIB without input controller system is unstable.

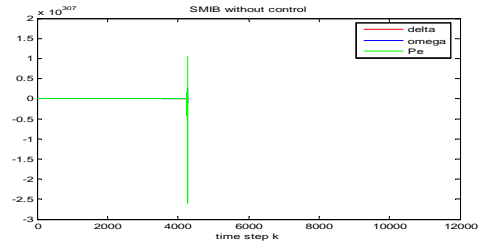


Figure 2. SMIB without control

Case 1. For case 1, we take pole=[-1;-2;-0.5] and by Matlab program, we get feedback gain

$$F = [-0.1763 \quad -1.3002 \quad 20.8375].$$

For this feedback gain, the performance of SMIB is stable (Figure 3a), the new input  $v_f$  is shown in Figure (3b) and the real input control  $u$  in Figure (3c).

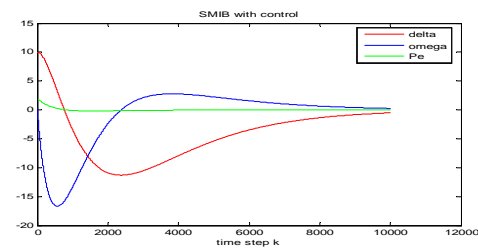


Figure 3a. SMIB with control input

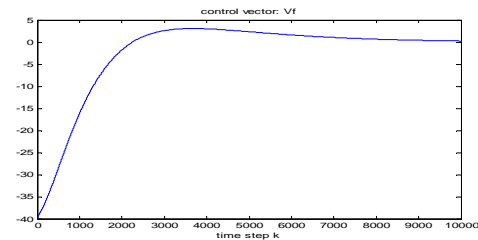


Figure 3b. The new input  $v_f$

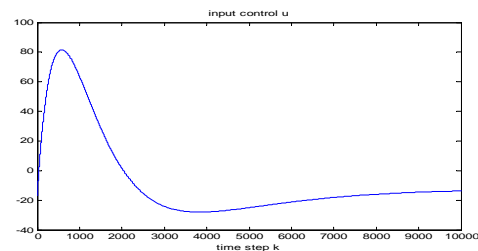


Figure 3c. control input  $u$

Case 2: For case 2, we take pole=[-5;-10;-3]; and by Matlab program we get feedback gain  $F = [-26.4402 \quad -15.8313 \quad 120.8875]$

In this case the system is stable, the state of system, new input  $v_f$  and control input  $u$ , are represented in Figure (4a),(4b),(4c).

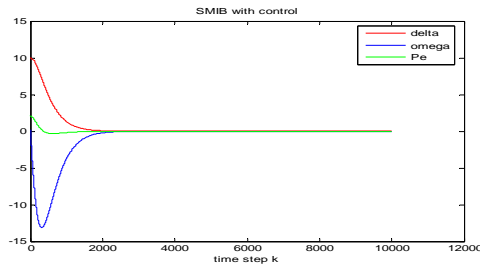


Figure 4a. SMIB with control input

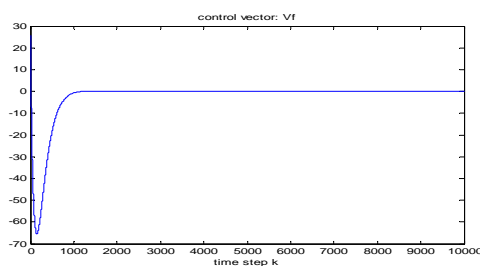


Figure 4b. The new input  $v_f$

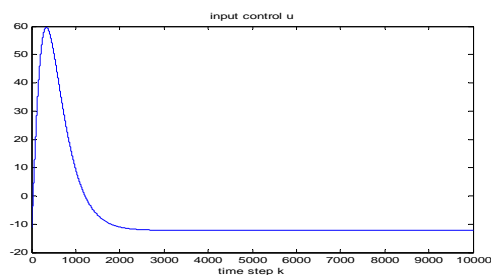


Figure 4c. Control input  $u$

Case 3. For pole=[0;-1;-2]; and we get  $F=[0.0000 \ -1.0909 \ 17.3875]$ ; The SMIB system is unstable. The performance, the new input and control input are represented Figure (5a),(5b), and (5c)

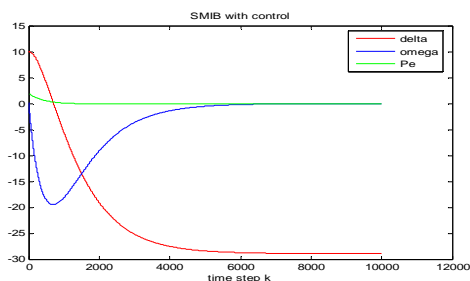


Figure 5a. SMIB system with control

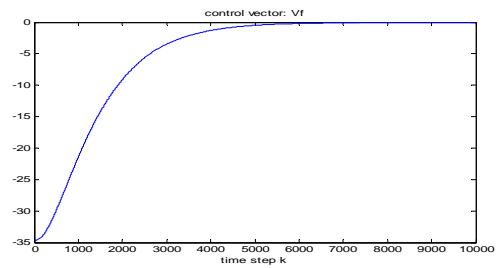


Figure 5b. Control input  $v_f$

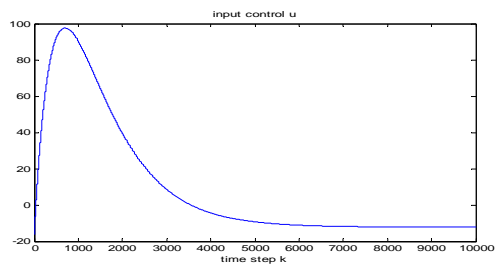


Figure 5c. Control input  $u$

From those figures, we know that the SMIB system without control input is unstable. The case 3, feedback gain  $F=[0.0000 \ -1.0909 \ 17.3875]$  is an example of system with control input  $u(t)$ , but system is still unstable. This is happen because control feedback system Eq.(17) has pole zero.

#### 5. CONCLUDING REMARK

From our analyze and simulation we conclude that

- The DFL method can be applied to design the controller of SMIB
- The feedback gain of linear system is determined by function in Matlab
- The second case,  $F=[-26.4402 \ -15.8313 \ 120.8875]$  give a good performance, the state is stable with smooth performance, without oscillation.

#### Bibliography

- [1] Yadaiah, N., Ramana, NY,2006, Linearization of multi machine power system: Modeling and control
- [2] Imam Robandi, 2006, Desain Sistem Tenaga Modern, Penerbit Andi
- [3] Ogata, K., 1997, Modern Control Engineering, Prentice Hall.