

# **Coordinated Design Of A PSS And An SVC-Based Controller To Enhance**

## **Power System Stability**

**Abido, MA; Abdel-Magid, YL**

**ELSEVIER SCI LTD, INTERNATIONAL JOURNAL OF ELECTRICAL POWER**

**ENERGY SYSTEMS; pp: 695-704; Vol: 25**

King Fahd University of Petroleum & Minerals

**<http://www.kfupm.edu.sa>**

### **Summary**

Power system stability enhancement via robust coordinated design of a power system stabilizer and a static VAR compensator-based stabilizer is thoroughly investigated in this paper. The coordinated design problem of robust excitation and SVC-based controllers over a wide range of loading conditions and system configurations are formulated as an optimization problem with an eigenvalue-based objective function. The real-coded genetic algorithm is employed to search for optimal controller parameters. This study also presents a singular value decomposition-based approach to assess and measure the controllability of the poorly damped electromechanical modes by different control inputs. The damping characteristics of the proposed schemes are also evaluated in terms of the damping torque coefficient over a wide range of loading conditions. The proposed stabilizers are tested on a weakly connected power system. The non-linear simulation results and eigenvalue analysis show the effectiveness and robustness of the proposed approach over a wide range of loading conditions. (C) 2003 Published by Elsevier Science Ltd.

### **References:**

1. ABDELMAGID YL, IEEE PES
2. ABIDO MA, 2002, 14 POW SYST COMP C P
3. ASGHARIAN R, 1994, IEEE T ENERGY CONVER, V9, P475
4. FAILAT EA, 1996, ELECTR POW SYST RES, V39, P103
5. GIBB WRG, 1991, MOVEMENT DISORD, V6, P2
6. HAMDAN AMA, 1999, INT J ELEC POWER, V21, P417

© Copyright: King Fahd University of Petroleum & Minerals;  
<http://www.kfupm.edu.sa>

7. HAMMAD AE, 1986, IEEE T POWER SYST, V1, P222
8. HERRERA F, 1998, ARTIF INTELL REV, V12, P265
9. HSU YY, 1987, IEE PROC-C, V134, P238
10. KUNDUR P, 1989, IEEE T POWER SYST, V4, P614
11. KWAKERNAAK H, 1993, AUTOMATICA, V29, P255
12. MAHRAN AR, 1992, IEEE T ENERGY CONVER, V7, P615
13. NOROOZIAN M, 1994, IEEE T POWER DELIVER, V9, P2046
14. PADIYAR KR, 1991, IEEE T POWER SYST, V6, P458
15. RAHIM AHMA, 1996, IEE P-GENER TRANSM D, V143, P211
16. SAUER PW, 1998, POWER SYSTEM DYNAMIC
17. VIDYASAGAR M, 1986, AUTOMATICA, V22, P85
18. WANG HF, 1997, IEEE T POWER DELIVER, V12, P941
19. YANG TC, 1997, INT J ELEC POWER, V19, P29
20. YU YN, 1983, ELECT POWER SYSTEM D

For pre-prints please write to: [abstracts@kfupm.edu.sa](mailto:abstracts@kfupm.edu.sa)