











- feedbacks— Comparative study, *IEEE Trans. Ind. Electron.*, vol. 54, no. 2, pp. 1193–1206.
- [6] M. A. Valenzuela, J. M. Bentley, and R. D. Lorenz, (2005). Evaluation of torsional oscillations in paper machine sections, *IEEE Trans. Ind. Appl.*, vol. 41, no. 2, pp. 493–501.
- [7] Y. Hori, H. Sawada, and Y. Chun, (1999). Slow resonance ratio control for vibration suppression and disturbance rejection in torsional system, *IEEE Trans. Ind. Electron.*, vol. 46, no. 1, pp. 162–168.
- [8] K. Michels, F. Klawonn, R. Kruse, and A. Nürnberger. *Fuzzy Control— Fundamentals, Stability and Design of Fuzzy Controllers*. New York: Springer, 2006.
- [9] J. K. Ji and S. K. Sul, (1995). Kalman filter and LQ based speed controller for torsional vibration suppression in a 2-mass motor drive system, *IEEE Trans. Ind. Electron.*, vol. 42, no. 6, pp. 564–571.
- [10] R. Peter, I. Schoeling, and B. Orlik, (2003). Robust output-feedback H<sub>1</sub> control with a nonlinear observer for a two-mass system, *IEEE Trans. Ind. Appl.*, vol. 39, no. 3, pp. 637–645.
- [11] R. Dhaouadi and K. Kubo, (1999). A nonlinear control method for good dynamic performance elastic drives, *IEEE Trans. Ind. Electron.*, vol. 46, no. 4, pp. 868–870.
- [12] P. Korondi, H. Hashimoto, and V. Utkin, (1998) Direct torsion control of flexible shaft in an observer-based discrete-time sliding mode, *IEEE Trans. Ind. Electron.*, vol. 45, no. 2, pp. 291–296.
- [13] L. Wang and Y. Frayman, (2002). A dynamically generated fuzzy neural network and its application to torsional vibration control of tandem cold rolling mill spindles, *Eng. Appl. Artif. Intell.*, vol. 15, no. 6, pp. 541–550.
- [14] T. Orłowska-Kowalska and K. Szabat, (2007). Control of the drive system with stiff and elastic couplings using adaptive neuro-fuzzy approach, *IEEE Trans. Ind. Electron.*, vol. 54, no. 1, pp. 228–240.
- [15] Tomizuka, M. (1987). Zero-phase error tracking algorithm for digital control. *ASME, Journal of Dynamic Systems, Measurement and Control*, 109(1), 65-68.
- [16] Tomizuka, M. (1993). On the compensation of friction forces in precision motion control. *Proceedings of the Asia-Pacific Workshop on Advances in Motion Control*, pp. 69-74.
- [17] Umeno, T., Kaneko, T., & Hori, Y. (1993). Robust servo system design with two degrees of freedom and its application to novel motion control of robot manipulators. *IEEE Transactions on Industrial Electronics*, 40(5), pp 473-485.
- [18] Yao, B., Al-Majed, M., & Tomizuka, M. (1997). High-performance robust motion control of machine tools: an adaptive robust control approach and comparative experiments. *IEEE/ASME Transactions on Mechatronics*, 2(2), pp.63-76.
- [19] Choi, B.K., Choi, C.H., & Lim, H. (1999). Model-based disturbance attenuation for CNC machining centers in cutting process. *IEEE Transactions on Mechatronics*, 4(2), pp.157-168.
- [20] Zhang, G., Fufusho, J., & Fajitani, M. (1996). Control of flexible-joint manipulators using joint torque and acceleration feedback. *Proceedings of the 3rd Conference on Motion and Vibration Control*, pp. 245-250.
- [21] Zhang, G., & Furusho, J. (1998). Control of robot arms using joint torque sensors. *IEEE Control Systems Magazine*, 18(1), 48-55.
- [22] Fischer, M., & Tomizuka, M. (1996). Application and comparison of alternative position sensors in high-accuracy control of an XY table. *Proceedings of the AMC, Mie*, pp. 494-499.
- [23] Hyuk Lim, Jin-Woo Seo and Chong-Ho Choi. (2000). Torsional displacement compensation in position control for machining centers. *Control Engineering Practice* 9, pp. 79-87.
- [24] Utkin, V. I. (1994). *Sliding mode control in discrete time and difference systems*. *Variable Structure and Lyapunov Control*. Alan S.I. Zinober (Ed.) Springer, pp. 87-107.
- [25] Su, W.C, S.V. Drakunov & U. Ozguner (2000). An O (T<sup>2</sup>) boundary layer in sliding mode for sampled-data systems. *IEEE Transactions on Automatic Control* 45(3), 482-485.
- [26] Li, Y.F, B. Eriksson & J. Wikander (2000). Discrete-time sliding mode control for linear systems with nonlinear friction. *Advances in Variable Structure Systems Analysis, Integration and Applications*. *Proceedings of the 6th IEEE International Workshop on Variable Structure Systems*.
- [27] Yu-Feng Li, Jan Wikander. (2002). Discrete-time sliding mode control of a dc motor and ballscrew driven positioning table. *15th Triennial World Congress, Barcelona, Spain*.
- [28] Young, D. K., V. I. Utkin & U. Ozguner (1999), A control engineer's guide to sliding mode control. *IEEE Transaction on Control System Technology* 7(3).
- [29] Nonami, K., T. Ito, Y. Kitamura & K. Iwabuchi (1996). Frequency-shaped sliding mode control using H<sub>∞</sub> control and m synthesis theory. *1996 IEEE Workshop on Variable Structure Systems*.
- [30] Xu, J.X. & W.J. Cao (2000). Synthesized sliding mode control of a single-link flexible robot. *Int. J. control* 73(3), 197-209.
- [31] Moura, J. T., R. G. Roy & N. Olgac (1997). Sliding mode control with perturbation estimation (SMCPE) and frequency shaping sliding surfaces. *Transactions of the ASME* 119.
- [32] Jalili, N. & N. Olgac (1998). Time-optimal/sliding mode control implementation for robust tracking of uncertain flexible structures. *Mechatronics* 8, 121-142.
- [33] Hara, S. & K. Yoshida (1996). Simultaneous optimization of positioning and vibration control using time-varying frequency-shaped criterion function. *Control Engineering Practice* 4(4), 553-561.
- [34] Sato, K, Nakamoto, K, and Shimokohbe. (2004). A Practical Control of Precision Positioning Mechanism with Friction, *Precision Engineering*, 28, 426-434.
- [35] T. Kitamori, (1980). Design Theory of PID Control System, *Journal of SICE*, Vol. 19, No.4, pp. 382-388.
- [36] J. G. Ziegler and N. B. Nichols, (1942). Optimum Setting for Automatic Controllers, *Trans. ASME*, Vol.64, pp. 759-768.
- [37] G. H. Cohen and G. A. Coon, (1953). Theoretical Consideration of Retard Control, *Trans. ASME*, Vol. 75, pp. 827-834.
- [38] Haruhisa Kawasaki and Geng Li. (2001). Automatic PID Tuning Considering Motor Maximum Input and Power Consumption for Servo Control Systems. *INTERMAC2001 Joint Technical Conference*.
- [39] Angela Porumb. (1997). Position Control of an elastic two-mass driving system with backlash and friction, using sliding mode controller. *scientific journal, Mechanics, Automatic, Control and Robotics* Vol.2, No 7, pp. 285 -290.
- [40] Bin Yao and Masayoshi Tomizuka, (1997). High Performance Robust Motion Control of Machine Tools: An Adaptive Robust Control Approach and Comparative Experiments, *Proc. ACC.*, pp. 2754-2758.
- [41] Ohnishi, K., Shibata, M. and Murakami, T.,(1996). Motion Control for Advanced Mechatronics, *IEEE/AMSE Trans. on Mechatronics*, Vol. 1, No.1, pp. 56-67.
- [42] Umeno and Hori, (1991). Robust Speed Control of DC Servomotors using Modern Two degrees-of-Freedom Controller Design, *IEEE Trans. on IE*, Vol.38, No.5, pp.363-368.
- [43] Doo- Jin Shin and Uk-Youl Huh. (2000). Robust Motion Controller Design for Servo System with 2 Mass Characteristics. *AMC2000*. Nagoya. Pp. 423-426.
- [44] I. Scholing, B. Orlik. (2000). Control of a Nonlinear Two-Mass System with Uncertain Parameters and Unknown States. *IEEE*. pp.1096-1103.
- [45] D. Schroder, (2000), *Intelligent Observer and Control Design for Nonlinear Systems* Springer.
- [46] Karsten Peter, Ingo Schöling, and Bernd Orlik. (2003). Robust Output-Feedback H Control With a Nonlinear Observer for a Two-Mass System. *IEEE Trans. Ind. Applications*, vol. 39, no. 3, pp. 637-644.
- [47] Fitri M.Y, Wahyudi and R.Akmeliawati, Improved NCTF Control Method for a Two Mass Point to Point Positioning System, *Proceedings of the 2010 IEEE 3<sup>rd</sup> International Conference on Intelligent and Advanced systems (icias 2010)*, Kuala Lumpur, Jun 2010.
- [48] Mohd Fitri Mohd Yakub, and R.Akmeliawati, Performance Improvement of Improved Practical Control Method for Two-Mass PTP Positioning Systems in the Presence of Actuator Saturation, *Proceedings of the 2011 IEEE Applied Power Electronics Colloquium (IAPEC2011)* 18-19 April 2011, Johor Baru.