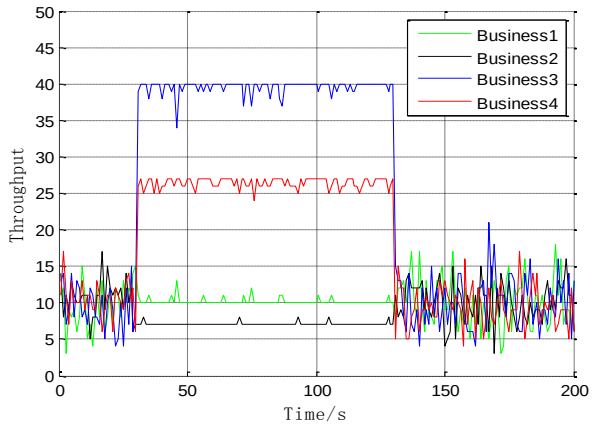

Fig. 2 Four different business

Fig. 3 shows the CPU utilization of high and low priority business under our proposed algorithm. Fig. 3 tells us, by our algorithm, high and low priority business is successfully controlled under the overload threshold of CPU utilization. As shown in Figs. 2 and 3, the total CPU utilization is maintained at about 0.8, and the high and low priority CPU utilization meet the requirements of the default. This shows that, our algorithm can effectively operate the overload control of application server, and meet certain fairness and effectiveness.

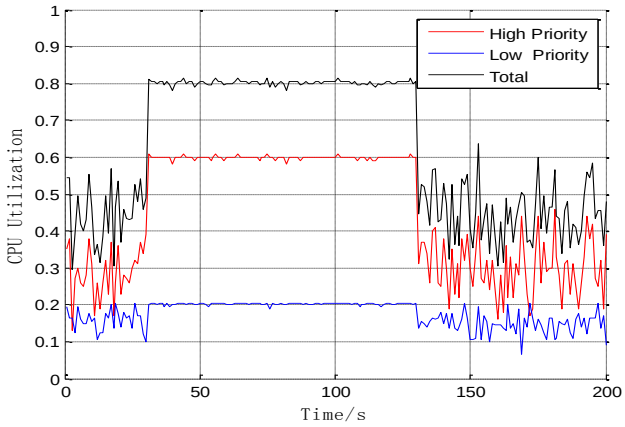

Fig. 3 CPU utilization.

Figure 4 shows the energy efficiency of network between our PSO algorithm and the existing RA algorithm. From Figure 4, we find that, compared with RA, our PSO algorithm has better energy efficiency. This indicates that our SA algorithm has better energy efficiency. More importantly, at the overload starting time(31s), RA energy efficiency has greater volatility, and our energy efficiency is relatively stable, which further indicates the robustness of our SA algorithm is better. Figure 3 and 4 show that, our PSO algorithm has succeeded in reducing the demand of application server for resources. Moreover, our energy efficiency control algorithm PSO can effectively control the overload service rate, make business rate remain at a steady state, and various business satisfy the fairness requirement basically.

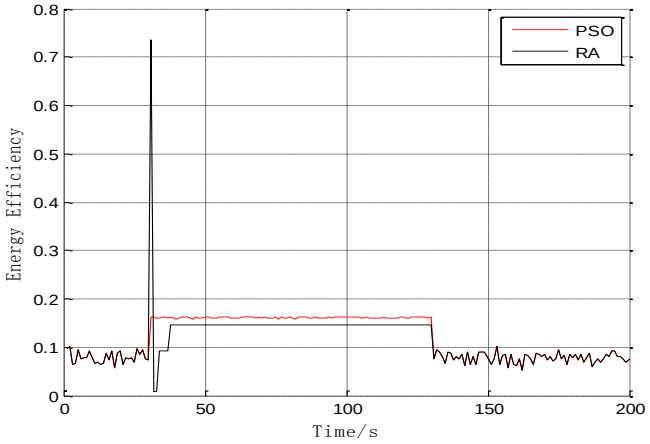

Fig. 4 Energy efficiency of network

VI . Conclusions

This paper studies the overload control method of the next generation electric communication network application server. By establishing the relationship function between the control input rate and energy efficiency, we construct the optimization model with overload control as constraint conditions. To solve the optimal model, we propose an energy efficiency overload control algorithm based on PSO. The simulation results show that our algorithm is feasible and effective.

References

[1] D. Jiang., Z. Xu, L. Nie, et al. An approximate approach to end-to-end traffic in communication networks, Chinese Journal of Electronics, 2012, 21(4): 705-710.
[2] D. Jiang, Z. Xu, et al. Joint time-frequency sparse estimation of large-scale network traffic, Computer Networks, 2011, 55(10): 3533-3547.
[3] S. Mohapatra. Integrated planning for Next Generation Networks. In Proc. of ISINMW'09, New York, Jun. 1-5, 2009, pp. 205-210.
[4] Z. Deng, X. Tan. Overload control for parlay gateway in the next generation network. In Proc. of ICITA'10, Aug. 20-22, 2010, pp. 1-4.
[5] D. Jiang, Z. Xu, H. Xu, et al. An approximation method of origin-destination flow traffic from link load counts, Computers and Electrical Engineering, Nov. 2011, 37(6): 1106-1121.
[6] D. Jiang, G. Hu. GARCH model-based large-scale IP traffic matrix estimation. IEEE Communications Letters. 2009, 13(1): 52-54.
[7] A. Abdelal, W. Matragi, et al. Signal-Based Overload Control for SIP Servers. In Proc. of CCNC'10, Las Vegas, Jan. 9-12, 2010, pp. 1-7.
[8] D. Hwang, J. Park, et al. A window-based overload control considering the number of confirmation Massages for SIP server. In Proc. of ICUFN'12, Phuket, Jul. 4-6, 2012, pp. 180-185.
[9] Z. Chentouf. SIP overload control using automatic classification. In Proc. of SIECPC'11, Riyadh, Apr. 24-26, 2011, pp. 1-6..
[10] S. Lee. A Distributed Link Management Algorithm for Energy Efficient Networks. In Proc. of (Globecom'11), Houston, Dec. 5-9, 2011, pp. 1-5.
[11] A. Cianfrani. Introducing routing standby in network nodes to improve energy savings techniques. In Proc. of ICFES'12 Madrid, May 9-11, 2012, pp. 1-7.
[12] L. Lu. An improved particle swarm optimization algorithm. In Proc. of ICGC'08, Hangzhou, Aug. 26-28, 2008, pp. 486-490.
[13] W. Wu, F. Yang, et al. The study on overload control of application server in next-generation networks. In Proc. of ICCT'03, Beijing, Apr. 9-11, 2003, pp: 1429-1432.