

obtained; for data acquisition, direct display press mounting force experiment file inside the data values.

The composite elements model were expressed as follows:

$$J(R_{Calculation}) = \begin{bmatrix} \text{Calculation} & \Gamma(J(R_{Press-fit force})) & V(J(R_{Press-fit force})) \\ & \Gamma(J(R'_{Press-fit force})) & V(J(R'_{Press-fit force})) \\ & \Gamma(J(I_{Press-fit force})) & V(J(I_{Press-fit force})) \end{bmatrix} \quad (11)$$

$$J(R_{Experiment}) = \begin{bmatrix} \text{Experiment} & \Gamma(J(I_{Graph})) & V(J(I_{Graph})) \\ & \Gamma(J(I_{Experiment})) & V(J(I_{Experiment})) \\ & \Gamma(J(Q_{Press-fit force})) & V(J(Q_{Press-fit force})) \end{bmatrix} \quad (12)$$

5. CONCLUSIONS

Constructed by using the metamodeling of extension theory was a new method for KBS based on researching of matter element model, thing element model, relationship element module and composite element model with implication and extension. The constructing of press-fit force module in KBS based on the metamodeling of extension theory was studied. The result indicate that the extension element theory could not only express the process of constructing a knowledge module in KBS more systematically and comprehensively, but also solve the problem of complex knowledge information.

ACKNOWLEDGMENT

This research was supported by the National Natural Science Foundation Youth Fund of China (No. 51005114); The Fundamental Research Funds for the Central Universities, China (No. NS2014050); The Research Fund for the Doctoral Program of Higher Education, China (No. 20112302130003); Jiangsu Planned Projects for Postdoctoral Research Funds (No. 1301162C).

REFERENCES

- [1] Yang Y., Zou S. L. and Cai Y., "Principle of Knowledge Base System," *Journal of East China Geological Institute*, 2001.
- [2] Brodie M. L. and Mylopoulos J., "On knowledge base management systems: integrating artificial intelligence and database technologies," *Topics in Information Systems*, Berlin: Springer, 1986, edited by Brodie, Michael L.; Mylopoulos, John, 1986.
- [3] Li Chen and Mei Zhong-yi, "Research on knowledge-based system for the aircraft composite typical component design based on Web," *Manufacturing Automation*, no. 2, pp. 29-33, 2015.
- [4] Zhang Junyan, An Luling, Li Wei, etc., "Research and development of knowledge base system for process design of composite-structure," *Aeronautical Manufacturing Technology*, no. 18, pp. 60-63, 2015.
- [5] Robin Andersson, A. V. Ski and Jan Komorowski. "A rough knowledge base system," *Science LNC*, Springer Berlin, pp. 48-58, 2014.
- [6] Corporatoin S., "System for linking medical terms for a medical knowledge base," 2014.
- [7] Cai Wen. "Extension set and Non-compatible Problems," *Science Exploration*, no. 1, 1983.
- [8] Yang Chunyan, *Extenics*, Science Press, 2014.
- [9] Chen Xiaoyi, "Research on key technology of product collaborative design based on Web and its system implementation," Nanjing University of Aeronautics & Astronautics, 2015.
- [10] Liu Jian, "CAE analysis and experimental study on the DCT shell bearing outer ring," Hefei: HeFei University of Technology, 2013.
- [11] Tian Xiaochun, "Reason analysis and preventive measures for the quality of the rolling bearing of the rolling bearing of the railway freight car," *Railway Quality Control*, vol. 42, no. 1, 2014.