











S/F	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>	f <sub>4</sub>
s <sub>1</sub>	0	+1	+1	+1
s <sub>2</sub>	0	-1	+1	-1
s <sub>3</sub>	-1	-1	+1	-1
s <sub>4</sub>	-1	-1	+1	-1
s <sub>5</sub>	0	-1	-1	+1

Fig. 2. FIS for the injection system marine diesel engine:  $s_1$  – air pressure charging,  $s_2$  – exhaust gas temperature of the cylinder,  $s_3$  – maximum cylinder pressure,  $s_4$  – mean indicated pressure,  $s_5$  – maximum injection pressure,  $f_1$  – drop injector opening pressure,  $f_2$  – non-leak-proof injection pump (precise pair),  $f_3$  – wear the spray holes,  $f_4$  – carbonization the spray holes (plugging spray holes)

## 5. Summary

Making the right choice of diagnostic parameters is one of the most important factors determining the correctness and usefulness of the developed diagnostic algorithms.

With respect to technically complex objects with a large number of diagnostic parameters, it is also important to minimize the number of diagnostic parameters so that the diagnostic algorithm is relatively simple but allowing recognition for damage.

Goals mentioned above can be realized by introducing the concept of diagnostic sensitivity of the parameter. This makes it much easier to make the right decision when choosing diagnostic parameters. Unfortunately, sometimes the difficulty of accessing and measuring the diagnostic parameter can be a reason for not using in diagnostic algorithms of a good, diagnostically sensitive parameter.

The use of trivalent residue evaluations in the injection system marine diesel engine diagnostics, gives very good results – a good distinction of damage.

The possibility of use for the construction of algorithms and diagnostic programs, simulation research on a real object, presented in this article, is a laborious and expensive method, but it is possible to build an unambiguous diagnostic tool for a given object. It is very important that the adopted simulation method accurately reproduce the actual damage occurring during the operation of the engine. Study time can be significantly shortened if, based on the statistics of the most common types of engine damage, only simulations will be limited to them.

## References

- [1] Kościelny, J. M., *Diagnostics of Processes in Decentralized Structures*, Archives of Control Sciences, Vol, 7, No. 3/4, pp. 181-202, 1998.
- [2] Kościelny, J. M., *Diagnostyka procesów w strukturach zdecentralizowanych jednopoziomowych*, DPP'2001, pp. 355-358, Łagów 2001.
- [3] Kościelny, J. M., *Bezwarunkowa i warunkowa rozróżnialność uszkodzeń przy wielowartościowej ocenie residuów*, VI Konferencja Naukowo-Techniczna, DPP, pp. 55-60, Władysławowo 2003.