Jan Kochanowski University Press

This is a contribution from *Token*: *A Journal of English Linguistics*
Volume 4/2015.
Edited by John G. Newman, Marina Dossena and Sylwester Łodej.

On the semantic features of *prison slang*

Anna Ciechanowska* and Grzegorz Andrzej Kleparski**

** PWSTE Jarosław*
*** Uniwersytet Rzeszowski*

ABSTRACT

The phenomenon of *prison slang* has raised much controversy, and there have been various attempts by scholars of different periods to treat the matter comprehensively. Nevertheless, many of the linguistic features of this particular language variety have been neglected or ignored. As a result, widely and unequivocally accepted conclusions regarding this variety of slang have yet to be drawn. This paper provides an overview of significant lexico-semantic features of *prison slang*, and makes special reference to its ephemerality and creativity, its anti-normative character, its metaphorical variation, its relexicalisation and overlexicalisation, and its inherent tendency to draw on the lexical resources of other varieties, and even other languages.

1. Introduction

Beyond the sphere of ordinary free people, such as stock brokers, lawyers and linguists, lies a separate layer of subculture that thrives within prison walls in most countries of the world. Research into the prison community can provide a wealth of information related to its matrix, yet there remains a lack of precise and in-depth analysis of the specific linguistic repertoire used by inmates. Several explanations for the neglect of investigation into *prison language* are possible. One is that the examination of *prison lingo* in penal institutions has typically been considered part of greater studies dealing with prison from a broadly social perspective, and such studies would not emphasize prison usage to any large degree. A second is that data collection is problematic due to the fact that the subculture of prison institutions is immensely difficult to penetrate because inmates carefully protect much

information, in speaking and otherwise. In fact, the secrecy of *prison slang*[1] hinders the process of collecting a sufficient number of *prison argot* items which would constitute a *sine qua non* for any consistent and detailed analysis. A third is that although *prison lingo* may be said to enjoy a certain level of homogeneity across a larger geographical area, it certainly varies in specific terminology from one more local region to another. A common core of lexical items, collectively labelled as *prison slang*, is likely to be found in most correctional institutions. Widely used terms include *punk* 'an inmate turned out in prison', *shank* 'a knife', *bug juice* 'psychotropic medications', and others. Nevertheless, variation, often reflecting the level of the penal institution and the sociological characteristics of subgroup members, is evident. Further, those characteristics, some of which relate to racial or gang lineage, colour *prison argot* in complex ways.

Regardless of the array of difficulties involved here, a number of attempts at accounting for prison culture, including language use, have been made. They have taken various perspectives and have resulted in works such as those by Clemmer (1940), Maurer (1955), Sykes (1958), Cardozo-Freeman (1984), Szaszkiewicz (1997), Przybyliński (2005), and others. Nevertheless, little attention has been paid in these and other similar studies to the communicative systems of inmates. *Prison slang* has played a relatively small part in these fundamentally socio-cultural works. However, a few studies which specifically target the language of this subculture have been done. Among them are Oryńska (1991), Einat – Einat (2000), Einat – Livnat (2012) and Stępniak (2013). This paper intends to augment that research and to propose a systematic picture of the linguistic features of *prison argot.*

2. Linguistic features of *prison argot*

Although the grammar of *prison argot* approximates that of the greater standard dialect of the language, the vocabulary differs markedly from the standard (cf. Schulte 2010: 47). It is also recognized that this variety is largely a spoken variety (cf. Maurer – Vogel (1954 [1973: 369]). However, a certain amount of written evidence for *prison argot* may be found in diaries, letters, tattoos, ballads, songs, and poems: see also Szaszkiewicz (1997).

[1] On the secret nature of *prison argot*, see also Sykes (1958), Fiszer (2012), Gambetta (2009) and Russel (2014).

At a finer level, we find various additional features of *prison argot*. Perhaps chief among them is that of its creative and ephemeral nature. According to Pollock, "prison slang is a dynamic, constantly evolving entity. Some of the earliest examples may have very different meanings today, if they are used at all. Terms tend to change over time and vary among institutions and across different regions of the country"(2006: 94-95). The fact that prison communities are shifting populations may be responsible in part for the transience of *prison argot*, or *prison slang*, but the effects of population shifts on linguistic usage remain to be demonstrated. Further, *prison slang* must to some extent be ingenious and much of its lexis short-lived precisely because two of its main functions are exclusivity and maintenance of a kind of *anti-society*[2], or counter-reality. Prisoners, apparently, often wish to exclude custodial officers from comprehending their speech, and to maintain a kind of counter-culture. As Schulte has noted, *prison slang* "is constantly renewing itself in order to sustain the vitality that it needs if it is to function at all"(2010: 49). *Prison slang* terms tend to exhibit weaker stability than lexical items that belong to the standard. Maurer – Vogel (1954 [1973: 368]) describe *prison argot* as a language variety "with a high birth rate of words balanced by a high death rate within the in-groups, and a relatively low survival rate compared to standard language". The secret nature of *prison argot* is maintained by means of inventive vocabulary creation but also by the rapid obsolescence and displacement of words. Terms such as *calaboose*, *cross bar hilton*, *hoosegaw* and *slammer* were once used in the sense of 'prison', but they eventually became obsolete and were replaced by others, such as *big house* and *joint*. Lastly, we should not omit to mention here that many of the new words which form the backbone of *prison argot* signify objects integral to prison life, some allowed by prison officials, like cigarettes, and some forbidden, like drugs and make-shift weapons. The words *lemac* and *bull-derm* 'tobacco, cigarettes' have gone obsolete and have been replaced by *fug*, *square*, and *joes*, among others, with the same meanings. The Polish prison environment presents an interesting case. There we encounter several terms that disappeared from the prison lexicon not for the usual reasons, but specifically because of certain sociopolitical and cultural changes which occurred in Poland following the fall of the Berlin Wall. Those terms ceased to be extralinguistically motivated. Terms such as *mosiek* and *esbek*, both used to convey the sense of 'police officer' went obsolete[3]. Likewise, *kolegiant*, the

[2] For more on the issue of *anti-society*, see Halliday (1976).

[3] In one dictionary of the Polish language, *Słownik Języka Polskiego*, the noun *mosiek* is cited as a diminutive form of a common Jewish name *Mosze*, which is used as

semantic reading of which is 'person being incarcerated for committing an offence', fell out of use due to changes in the Polish legal system[4].

In fact, the ephemerality inherent in *prison slang* entails creativity, imagination, humour, expressivity, and irony, which may manifest themselves in various ways. For instance, *prison argot* makes prolific use of figurative language. This is likely related primarily to the fact that prisoners often want to keep their communications secret from guards and certain other prisoners. However, this characteristic serves other functions as well. It is widely acknowledged that life within correctional institution walls can involve highly charged situations in which figurative, colourful, humorous, or ironic language may diffuse tensions. Such usage is capable of alleviating the drudgery of life behind bars and fostering group solidarity, mutual recognition, prestige, and a sense of exclusiveness[5].

Diverse examples may illustrate this point. In English, *mud duck* is used in *prison argot* to mean 'ugly girl' and *broadway* to mean 'a particular floor of a prison where inmates may walk, interact, or reside if the prison is overcrowded'. Note that *mud duck* is an instance of a specific kind of metaphor referred to in Kleparski (1997, 2002, 2007) as *animal metaphor*, or, alternatively, *zoosemy*, whereas *broadway* is an example of *eponymy-based metaphor*. Looking again to the Polish prison environment and its slang, we see that the term *dzieci naczelnika*, literally 'children of the warden', is used in the sense of 'lice'. It should be noted here that this particular term is an example of the conceptual mechanism referred to in Kleparski (1997) as

a derogatory label for a person of Jewish origin. The roots of the negative emotional load of this noun are explained by Peisert (1992), who maintains that the application of the term is related to the fact that as many as 40% of the managerial positions in the Ministry of Public Safety during the times of PRL (the Polish People's Republic) were occupied by officers of Jewish origin (cf. Szwagrzyk 2005). Hence, it should come as no surprise that there had existed certain stereotypes due to which police officers or correctional officers were somewhat naturally associated with people of Jewish origin. On the other hand, the acronymy – based term esbek was used colloquially in the sense of an officer of the Security Service in Poland before 1990, and its roots go back to the combination of letters SB, which derive from *Służba Bezpieczeństwa* (Security Service), the authority which both historically and sociologically has been perceived as an apparatus of control and oppression (see Piotrowski 2000).

4 Before the turn of the 21st century, the extrajudicial authority in Poland called *Kolegium do Spraw Wykroczeń* (Board for Adjudication of Misdemeanors) was responsible for ruling on offences, but since 2001 such cases have been considered by courts (see Ustawa z dnia 20 maja 1971 r. o ustroju kolegiów do spraw wykroczeń Dz.U. z 1971 r. Nr 12, poz. 118).

5 For more on the solidarity-maintaining function of *prison argot*, see Pollock (2006) and Einat – Livnat (2012).

reverse multiple grounding or, alternatively, *reversed zoosemy* by Grygiel (2005)[6]. Another striking example of the use of metaphor in Polish *prison argot* is *ogrodnik*[7], literally 'gardener', which is used in the sense of 'village thief'.

Halliday (1976), who made an attempt to account for the *argot* of criminals in terms of an *anti-language,* identified metaphorical variation as one of the three main characteristics of every underworld, or demimonde, *lingo*. If we follow the theory proposed by Halliday (1976), who conjectured that any *anti-society* is, in its structure, a metaphor for society, we may assume that the subculture of prisoners, including its language, is a metaphorical identity itself at the level of the social semiotics. As a result, the metaphorical quality, but also its creativity, imagination, humour and irony in the realm of *prison argot* expressions, is visible up and down the system, and these features, apparently, make the language vivid and constantly current.

The second and third characteristics of underworld *lingos* like *prison slang* which Halliday (1976) identified are relexicalisation and overlexicalisation. As far as relexicalisation is concerned, Halliday (1976) glossed it as the substitution of invented, unofficial words in certain areas of vocabulary in an *anti-language,* and noticed that this mechanism indeed does not influence the entire vocabulary of *prison argot*, but rather is restricted to certain lexical domains, especially those that are of primary importance to members of the subgroup. This claim aligns with one by Partridge (1933 [1979: 29]), who asserted that an *argot* expresses "the primary necessities of life, the commonest actions and functions, the most useful objects, the most useful or the most secret parts of the body, the most frequently occurring adjectives". English *prison slang* contains a wealth of examples that illustrate this feature, such as *crow* which is used in the sense of 'fake or cheap', and *jacket,* which may be employed to convey the human-specific sense of 'witness to a crime (who may testify later)'[8]. Considering once again Polish *prison slang*, and the mechanism of relexicalisation, we find one dictionary which lists hundreds of instances (Stępniak 2013) as well as numerous websites and forums which deal with the subject of Polish *prison argot*. Representative examples include zoosemic *muflon* (literally 'mouflon'), which is evidently used in the human-specific sense of 'a clumsy

[6] On *reversed zoosemy*, see also Kleparski (1997) and Grygiel (2005).

[7] For more on the issue of names of professions and occupations, see Cymbalista (2012).

[8] This term indicates that, as pointed out by Rusinek (2008a: 126), "there exists a historically universal connection between the conceptual macrocategories HUMAN BEING and CLOTHES, and this connection is not only of physical but also of conceptual nature". For more on this issue, see Kleparski – Rusinek (2008) and Rusinek (2008a, 2008b).

and sluggish person', and *pomarańczyk* (a diminutive form of *pomarańcza* 'orange or person related to an orange'), which is used in the human-specific sense of 'homosexual'[9]. Moreover, it is observed that *prison argot* across languages displays a strong tendency to take in numerous synonyms or near synonyms. As a result, this particular language variety is not merely relexicalised, but rather frequently overlexicalised in certain areas. In other words, it may be characterized by hypersynonymy, which, according to Thorne (2014: 206), is present "when a social subgroup invents far more terms for something than seems strictly necessary. […] The fairly obvious explanation is that these expressions do not just describe something, but have a greater symbolic importance for the group in question". Thus in English *prison argot*, we encounter such overtly zoosemic terms as *street bitch*, *birdie*, *prison wolf* and *jelly fish*, all of which are used in the human-specific sense of 'homosexual', as well as the zoosemic synonyms *gaycat*, *bug*, *cat-j*, and *cuckoo* meaning 'crazy or mentally ill prisoner'. In Polish *prison slang*, *Adela* (a Polish female name), *cięcie* (literally 'cutting'), *motyka* (literally 'pickax'), and *różyczka* (a diminutive form of *róża* 'rose') are all used in the female-specific sense of 'prostitute'. The number of terms used to convey the sense of 'police officer' in Polish *prison argot* is quite astonishing. Here we encounter examples such as *pies* (literally 'dog'), *fragles* (quite likely derived from the name of a muppet actor in the television series *Fraggle Rock*[10]), *flip* (most probably derived from the translated title of the comedy film *Laurel and Hardy*[11], in Polish *Flip i Flap*[12]), *kaczmarek* (a Polish surname), and *skobel* (literally 'staple').

An additional manifestation of the creativity and dynamic nature inherent to *prison argot* is evident in its tendency to draw on the lexical resources of other languages. English *prison slang* is often distinctly colourful and deeply expressive, especially in its Yiddish vocabulary that has contributed to its international nature and its vividness. Partridge (1933 [1979]) draws our attention to the many Yiddish words that have been integrated into *criminal slang* and attributes this to the fact that many Yiddish-speaking Jews were traders and vagabonds, and their contacts with other peoples resulted in language contact and borrowing of terms related

[9] It should be noted that this particular term is an example of the mechanism referred to in Kleparski (2008) as *foodsemy.*

[10] See also http://articles.latimes.com/1987-05-10/news/tv-6213_1_fraggle-rock.

[11] See also http:// www.britannica.com/topic/Laurel-and-Hardy.

[12] One may conjecture that *Flip* has acquired the sense of 'policeman, cop' because the movie character Flip is intimately connected with trouble, and policemen are more or less universally associated with trouble in the criminal world.

to petty crime and other affairs from Yiddish into various other languages. In English *prison lexis*, we come across terms of Yiddish origin such as *gunsel,* which is used in the human-specific sense of 'young male kept as a sexual companion', and *mazuma*, the semantic reading of which is 'money'. English *prison slang* also takes in terms that derive from *Cockney rhyming slang,* such as *bird lime*, which is used in the sense of 'time spent in prison' and *nick*, the semantic reading of which is 'prison'. In Polish *prison slang*, as has been convincingly shown by Kątny (2002) and Geller (1997), the donor languages Yiddish and German have had significant influences. *Giwera*, used in the sense of 'gun', *frajer*, meaning 'person who does not belong to the subgroup *grypsera*' [13], and *szopenfeld* signifying 'theft committed in a shop when a shop assistant is present' all originate from Yiddish. The terms *ajnbruch,* the semantic reading of which is 'breaking the cash register', *ajncel*, used in the sense of 'single cell', and *pinkel*, used to convey the senses of 'stolen money and booty or that which results from a crime' all derive from German. Also in Polish *prison argot* are words which originate from Russian or Ukrainian, such as *adinoczka* (literally 'loner'), which is used to convey the sense of 'single cell', *pokupka* (literally 'shopping') meaning 'theft', and *kułak* (literally 'a kulak' [14]), which serves to convey the human-specific sense of 'economic criminal'. Because Polish has borrowed extensively from the English vocabulary stock, it should come as no surprise that certain English words have found their way into Polish *prison slang*. *Gold*, in the sense of 'jewels', with a semantic reading of *inwitować* 'to welcome somebody' is one. *Return*, used in the sense of 'recidivism' or 'self-defense of criminals against police officers', is another. Clearly, borrowings increase the lexico-semantic complexity of *prison slang*, in fact regardless of whether or not the origins of various non-native terms are known. Of course significant language-external forces are causal to the adoption of most loanwords, and those forces bring about rich, vivid, colourful additions to *prison argot*, additions which, like their native counterparts, so often "satisfy prisoners' need for secrecy and exclusiveness" (Schulte 2010: 48).

[13] The Polish term *grypsera* is a label for a widely understood prison subculture in Polish penitentiaries. An alternative term for *grypsera* is *drugie życie* (literally 'second life'). For more on this issue, see Szaszkiewicz (1997) and Moczydłowski (1991).

[14] *Kulak* was a term for a relatively affluent farmer in the later Russian Empire as well as the early Soviet Union though the term was originally used to denote an independent farmer of the Russian Empire who emerged from the peasantry and gained wealth. The sense of the term was broadened and began to take on the meaning 'peasant who resisted handing over their grain to detachments from Moscow' (see Pipes 2001, Conquest 2001).

3. Conclusion

Researchers of various orientations have tackled problems related to the nature of *prison slang*. Most have emphasized relevant sociological phenomena, but a few have attended to particular linguistic patterns. However, depth and explication are still lacking as regards the lexico-semantic character of that language variety. This study has attempted to expand our picture of English *prison argot* as well as *prison argots* of other languages, like Polish, by detailing and exemplifying how *prison slang* is characteristically creative, ephemeral, figurative, and functionally secretive. It has also highlighted that this variety typically involves relexicalisation as well as overlexicalisation, which often leads to hypersynonymy, and it has underlined that subtypes of metaphorical use like *foodsemy* and *zoosemy*, as analysed by the *Rzeszów School of Diachronic Semantics*, help form the backbone of *prison slang*. Lastly, the discussion has made it clear that borrowing contributes not only to the stock of *prison argot* vocabulary, but also inevitably to the lexico-semantic complexity of the language variety.

REFERENCES

Sources

HBO Bids Farewell To Fraggle Rock
<http://articles.latimes.com/1987-05-10/news/tv-6213_1_fraggle-rock> (accessed on October 15th, 2014).

Laurel and Hardy
<http://www.britannica.com/topic/Laurel-and-Hardy> (accessed on October 15th, 2014).

Partridge, E.
1948 *The Dictionary of the Underworld*. London: Macmillan.

Słownik Języka Polskiego
<http://sjp.pwn.pl/> accessed on October 15th, 2014.

Stępniak, K.
2013 *Słownik Gwar Przestępczych.* Warszawa: Oficyna Wydawnicza Mireki.

Thorne, T.
2014 *Dictionary of the Contemporary Slang*. 4th edition. London: Bloomsbury.

Ustawa z dnia 20 maja 1971 r. o ustroju kolegiów do spraw wykroczeń (Dz.U. z 1971 r. Nr 12, poz. 118, <http://isap.sejm.gov.pl/DetailsServlet?id=WDU19710120118> (accessed on October 15th, 2014).

Special studies

Cardozo-Freeman, I.
1984 *The Joint: Language and Culture in a Maximum-Security Prison.* Springfield: Charles C. Thomas.
Clemmer, D.
1940 *The Prison Community.* New York: Rinehart.
Conquest, R.
2001 *Reflections on a Ravaged Century*. New York: Norton.
Cymbalista, P.
2012 "Metonymy and semantic modification. The phenomenon of names and professions and occupations". In: B. Kopecka – M. Pikor-Niedziałek – A. Uberman (eds.) *Galicia Studies in Languages: Historical Semantics Brought to the Fore*. Chełm: TAWA, 9-25.
Einat, T. – H. Einat
2000 "Inmate argot as an expression of prison subculture: The Israeli case", *The Prison Journal* 80(3), 309-325.
Einat, T. – Z. Livnat
2012 "Words, values and identities: The Israeli argot (jargon) of prisoners", *International Journal of Political Science, Law and International Relations* 2(2), 97-118.
Fiszer, R.
2012 "O języku na językach", *Forum Penitencjarne* 12, 6-10.
Gambetta, D.
2009 *Codes of the Underworld*. Princeton: Princeton University Press.
Geller, E.
1997 "Zur Etymologie einiger jiddischer und deutscher Schimpfwörter und Gaunerbezeichnungen im Polnischen", *Zeitschrift für Slawistik* 42(3), 274-284.
Grygiel, M.
2005 *Towards a Cognitive Theory of Semantic Change: Semantic Development of English Historical Synonyms of MAN/MALE HUMAN BEING in Panchronic Perspective*. Ph.D. Dissertation. Rzeszów: University of Rzeszów.
Halliday, M.A.K.
1976 "Anti-languages", *American Anthropologist* 78(3), 570-584.
Kątny, A.
2002 "Zu den Deutschen Lehnwörtern in der Polnischen Gaunersprache", *Studia Germanica Gedanensia* 10, 93-103.
Kleparski, G.A.
1997 *Theory and Practice of Historical Semantics: The Case of Middle English and Early Modern English Synonyms of GIRL/YOUNG WOMAN.* Lublin: Redakcja Wydawnictw Katolickiego Uniwersytetu Lubelskiego.
2002 "Lusta, mint a diszno: a hunt for 'correlative' zoosemy in Hungarian and English". *Studia Anglica Resoviensia* 1, 9-32.

2007 "Despotic mares, dirty sows, and angry bitches: On Middle English zoosemy and beyond". In: N.H. Kaylor, Jr. – R.S. Nokes (eds.) *Global Perspectives on Medieval English Literature, Language, and Culture.* Kalamazoo: Medieval Institute Publications, 93-116.

2008 "Dolce torta, dolce Angelina': Romance foodsemy with the Italian accent". In: G.A. Kleparski – A. Uberman (eds). *Galicia Studies in Language, Literature and Culture: With Special Reference to English and Diachronic Semantics.* Chełm: TAWA, 33-40.

Kleparski, G.A. – A. Rusinek

2008 "On the conceptual contiguity of the conceptual categories CLOTHES and HUMAN BEING". In: G.A. Kleparski – A. Uberman (eds.) *Galicia Studies in Language, Literature and Culture with Special Reference to English and Diachronic Semantics.* Chełm: Wydawnictwo TAWA, 41-50.

Maurer, D.W.

1955 *Whiz Mob: A Correlation of the Technical Argot of Pickpockets with Their Behaviour Pattern*. Gainesville: American Dialect Society.

Maurer, D.W. – V.H. Vogel

1954 [1973] *Narcotics and Narcotic Addiction*. Springfield: Thomas Books.

Moczydłowski, P.

1991 *Drugie Życie Więzienia*. Warszawa: Wydawnictwo Prawnicze.

Oryńska, A.

1991 "Kategorie semantyczne leksyki języka potocznego i gwary więziennej". In: J. Puzynina – J. Bartmiński (eds.) *Język a Kultura*, *Zagadnienia leksykalne i aksjologiczne* 2. Wrocław: Wiedza o Kulturze, 81-106.

Partridge, E.

1933 [1979] *Slang Today and Yesterday.* London: Routledge and Kegan Paul.

Peisert, M.

1992 "Nazwy narodowości i ras we współczesnej polszczyźnie potocznej". In: J. Anusiewicz – F. Nieckula (eds.) *Język a Kultura*, *Potoczność w Języku i Kulturze* 5. Wrocław: Wiedza o Kulturze, 209-223.

Piotrowski, M.

2000 *Ludzie bezpieki w walce z Narodem i Kościołem. Służba Bezpieczeństwa w Polskiej Rzeczypospolitej Ludowej w latach 1944–1978 – Centrala*. Lublin: Instytut Pamięci Narodowej – Komisja Ścigania Zbrodni Przeciwko Narodowi Polskiemu.

Pipes, R.

2001 *Communism: A Brief History*. New York: Random House.

Pollock, J.E.

2006 *Prison Today and Tomorrow*. Sudbury: Jones and Burtlett.

Przybyliński, S.

2005 *Podkultura Więzienna: Wielowymiarowość Rzeczywistości Penitencjarnej*. Kraków: Oficyna Wydawnicza 'Impuls'.

Rusinek, A.
2008a "Clothes and people go together: A historical inquiry into crossing the boundaries between conceptual categories". *Studia Anglica Resoviensia 5*, 125-138.
2008b "Clothes in the network of CDs: The case of sweater". In: R. Kiełtyka – D. Osuchowska – E. Rokosz-Piejko (eds.) *Language, Literature, Culture and Beyond.* Rzeszów: Wydawnictwo Uniwersytetu Rzeszowskiego, 138-145.
Russell, J.R.
2014 *Armenian Secret and Invented Languages and Argots.* Cambridge: Harvard University.
Schulte, M.
2010 "The language of the underworld and its sociolinguistic significance", *Contributions to the Study of Language, Literature and Culture. Arbeitsblätter des Anglistischen Seminars Heidelberg* 1, 45-60.
Sykes, G.M.
1958 *The Society of Captives: A Study of a Maximum Security Prison*. Princeton, NJ: Princeton University Press.
Szaszkiewicz, M.
1997 *Tajemnice Grypserki*. Kraków: Wydawnictwo Instytutu Ekspertyz Sądowych.
Szwagrzyk, K.
2005 "Żydzi w kierownictwie UB – stereotyp czy rzeczywistość?", *Biuletyn Instytutu Pamięci Narodowej* 11(58), 37-42.

Address: Anna Ciechanowska, Państwowa Wyższa Szkoła Techniczno-Ekonomiczna im. B. Markiewicza, ul. Czarnieckiego 16, 37-500 Jarosław, Poland
Grzegorz Andrzej Kleparski, Uniwersytet Rzeszowski, Al. mjr. W. Kopisto 2 B, 35-315 Rzeszów, Poland.