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ON DERIVATIONAL SUFFIXES AND INFLECTION CLASSES OF VERBS IN MODERN LITHUANIAN*

1. Introduction. The inflectional and derivational system of the Lithuanian verb is quite rich and complex. It consists of at least three morphomic stems, the inflection classes are defined by a number of features, and verbal lexemes are mostly formed by prefixation and suffixation [1]. In this paper, I will focus on verbal derivation by suffixation and its relation to the marking of inflection classes. In standard treatments of Lithuanian verb formation, it is claimed that verbs can be derived by adding certain suffixes, such as *-au-ti, -en-ti, -ė-ti, -y-ti, -in-ti*, *-o-ti, -uo-ti* [2], etc., e.g.: *úog-a* 'berry' → *uog-**áu**-ti* 'gather berries', *pur-ùs* 'loose' → *pur-**én**-ti* 'loosen', *šil̃t-as* 'warm' → *šilt-**ė́**-ti* 'get/grow warm', *gul̃-ti(-s)* 'lie down' → *gul-**ė́**-ti* 'lie', *vařd-as* '(a) name' → *vařd-**y**-ti* '(to) name', *kreĩp-ti* 'turn' → *kraip-**ý**-ti* 'shake, twist', *gès-ti* 'go out, become dim' → *ges-**ìn**-ti* 'put out, switch off, extinguish', *vaĩr-as* 'steering wheel' → *vair-**úo**-ti* 'drive, steer' (Ulvydas, ed. 1971: 247ff.; Jakaitienė 1973: 5; Ambrazas, ed. 1997: 221 and 2006: 386ff.). Somewhat less frequently, the inflectional function of verbal suffixes is also recognized by stating that they are employed in marking and formation of finite and non-finite forms (cf. Urbutis 1978: 143, 198f.; Ambrazas, ed. 1985: 186 and 2006: 282; Ambrazas 1999a: 37 and 1999b: 695; Ambrazas, ed. 1997: 221), but these notes have never been elaborated further. In this paper I suggest that some verbal suffixes can be interpreted as inflection-class marks and their derivational function manifests itself through the assignment of derived lexemes to inflection classes marked by these suffixes. In a number of aspects, the problem addressed here is comparable to the one of Sanskrit *-aya* formations discussed by Gregory T. Stump (2005a) and the criteria provided in his paper will be used to make a distinction between inflection-class marks and derivation marks. The morphological integration of verbal borrowings will be also briefly addressed within the context of typological data (Wohlgemuth 2009) and inflection-class productivity (Wurzel 1989: 158–163).

The paper is structured as follows. In section 2, the system of inflection classes of Lithuanian verbs is examined with an emphasis on the so-called "mixed" and "suffixal" verbs [3] and the status of their suffixes as marks of inflection classes is discussed. In section 3, the inventory of some derivational suffixes is briefly reconsidered when derivation by assignment to inflection class is taken into account. In section 4, the main points of the paper are summarized.

2. Inflection classes of Lithuanian verbs. The inflectional system of the Lithuanian verb is based on at least three morphomic stems traditionally labeled as the infinitive stem (Sinf), the present stem (Spres), and the past stem (Spast) (Ambrazas, ed. 1997: 284–296) [4]. The stems are related to certain sets of inflectional affixes and follow certain accentuation patterns to express an array of finite and non-finite verbal forms (Ambrazas, ed. 1997: 296–298, 307–316, 326–352, 372f.). For instance, to form PST.2SG [5] of *gérti* 'drink' and *pir̃kti* 'buy' the past stem *gér-* (which has a different root vowel compared to Sinf *gér-* and Spres *gẽr-*) and *pir̃k-* (equal to Sinf *pir̃k-* and different from Spres *pe˜rk-*) are used, but the first one gets suffix *-ei* and the accent is placed on the root (*gér-ei*), whereas the second one gets *-ai* and the accent falls on the suffix (*pirk-aĩ*). Therefore, the system of inflection classes of Lithuanian verbs can be interpreted as defined by characteristics of three domains, viz., (1) of stems, (2) of inflectional affixes, and (3) of prosodic features [6].

Each domain provides certain inflectional characteristics, which will be further referred to as features, and inflection classes will be treated as unique sets of features from these domains.

The traditional interpretation of inflection classes of Lithuanian verbs (e.g. Ambrazas, ed. 1997: 298–307) is based on the division of verbs into three conjugations defined by three inflection classes of Spres, viz., the *a*-type (1st conjugation), the *i*-type (2nd conjugation), and the *o*-type (3rd conjugation) discussed below in section 2.2. As a consequence, the inflection classes of Spres are given the highest status in the classification, and other features (like root apophony, certain structural types of the stems, specific affixes of Spres, inflection classes of Spast, etc.) are used to define further subtypes of these conjugations. To demonstrate the importance of stems in the system of inflection classes, an emphasis on stem alternations and especially on stem affixation is made in this paper, while the inflection classes of Spres and Spast (referred to as sets of inflectional affixes below) are given less attention. Although many features of inflection classes are closely interrelated and a number of hierarchical orderings of inflection-class features is possible, this question will not be addressed in this paper (cf. a hierarchical ordering of Lithuanian verbal inflection classes different from the traditional one in Dressler et al. 2006: 54, 61–64). Moreover, full description of inflection classes is not possible here and thus only a fragment of the system will be discussed. The accentuation patterns and other prosodic features are also left out of consideration [7].

Before proceeding further, the traditional classification of structural types of Lithuanian verbs has to be briefly presented. According to this classification, all verbs can be subdivided into three groups of "primary", "mixed", and "suffixal" verbs depending on whether certain suffixes can be segmented in their stems (Ambrazas, ed. 1997: 285, 289f.). The primary verbs have no suffixes before the markers of inflectional categories (e.g. *kèp-ti, kẽp-a, kẽp-ė* 'bake' [8]) and can be also referred to as non-suffixal [9], the suffixal verbs have suffixes in all stems (e.g. *aug-**ìn**-ti, aug-**ìn**-a, aug-**ìn**-o* 'grow (trans.)'), while the mixed ones have suffixes in some stems only (e.g. Sinf *sėd-**ė́**-ti,* Spast *sėd-**ė́j**-o* vs. Spres *sė́d-i* 'sit', Sinf *sváid-**y**-ti* vs. Spres *sváid-o,* Spast *sváid-ė* 'throw (repeatedly)'). The suffixes of the mixed and the suffixal verbs will be discussed in the second part of the following section, while the first part of it focuses on the primary verbs.

2.1. The domain of stems. In this domain, the verbs can be specified to have different stems due to morpho-phonological alternations and (or) addition of certain affixes [10]. It is important to note that these features are optional, and many verbs simply have stems without any alternations or specific (stem-forming) affixes, e.g.: *áug-ti, áug-a, áug-o* 'grow (intr.)', *sùk-ti, sùk-a, sùk-o* 'turn', *lìp-ti, lìp-a, lìp-o* 'climb', etc. In this case, the system of verbal stems can be characterized as invariant (Sinf = Spres = Spast).

The morpho-phonological alternations of verbal stems are traditionally subdivided into the ones affecting vowels and the ones affecting consonants. A number of stem alternations involving vowel change are traditionally known as (root vowel) apophony, which in some cases is also related to the alternation of prosodic features. For example, the present stem can be differentiated from the past and the infinitive stems, i.e. Spres vs. Spast = Sinf (e.g. /u:/ vs. /ʊ/ in *t**ũ**p-ti*, *t**ù**pi-a, t**ũ**p-ė* 'perch' or /ɛ/ vs. /ɪ/ in *v**i**lk̃-ti, v**e**lk̃-a*, *v**i**lk̃-o* 'tow'), or the past stem can be contrasted with the infinitive and the present stems, i.e. Sinf = Spres vs. Spast (e.g. /ɛ/ vs. /e:/ in *k**é**l-ti, k**ẽ**li-a*, *k**é**l-ė* or /ɪ/ vs. /i:/ in *p**ì**l-ti, p**ì**l-a, pýl-ė* 'pour'). Full discussion of all possible apophonic alternations is not relevant here, and the reader is referred to Ambrazas, ed. 1997: 67–73, 287f., 298–305. It is important to note that some vowel alternations are accounted for by morpho-phonological rules involving phonological contexts, like the so-called compensatory lengthening of vowels due to the loss of homosyllabic /n/ before sonorant and fricative consonants (cf. the contrast of /ɪ/ vs.

/iː/ in *kìl-ti, kỹl-a* (← *ki-ñ-l-a*), *kìl-o* 'rise') [11] or the contrast of /iː/, /uː/ (Sinf) in anteconsonantal position vs. /ɪ-j/, /ʊ-v/ (Spast) in antevocalic position (e.g. *vý-ti* vs. *vìj-(o)* 'drive, chase', *bū́-(ti)* vs. *bùv-o* 'be' [12]) (Ambrazas, ed. 1997: 62–66, 286f.), /uɔ/ vs. /a-v/ in the same contexts (e.g. *šlúo-ti* 'sweep' vs. Spast *šlãv-ė*) (Andronov 1999: 84, Ambrazas, ed. 1997: 72), etc.

The last consonants of verbal stems can be affected by a number of alternations some of which are also phonologically conditioned, cf. /s/ in anteconsonantal position vs. /t/, /d/ in antevocalic position (e.g. *mès-ti, mẽt-a, mẽt-ė* 'throw', *vès-ti, vẽd-a, vẽd-ė* 'lead') or metathesis of the type /kʃ/, /gz/, etc. in anteconsonantal position vs. /ʃk/, /zg/, etc. in antevocalic position (e.g. *réikš-ti, réiški-a, réišk-ė* 'mean', *mègz-ti, mẽzg-a, mẽzg-ė* 'knit'), etc. (Ambrazas, ed. 1997: 74f., 286).

A case of consonant alternation which is not conditioned by the phonological context can be exemplified by the palatalization and affrication [13] of consonants before non-front vowels. In Ambrazas, ed. 1997: 75, the comparative degree of adverbs (cf. *ger-aĩ* 'well', *aukšt-aĩ* 'high (above)' *judo-aĩ* 'in black' vs. *geri-aũ* 'better', *aukščі-aũ* 'higher', *juodži-aũ* 'blacker') and some other cases are mentioned, but the verbal stems affected by the same alternation are not listed in the chapter on morpho-phonology. One has to note that this type of contrast is possible both in Spres and Spast. In the case of Spres characterized by palatalization/affrication, the change is evident in most of the forms based on this stem, except for PRS.2SG when the alternation is neutralized by front vowels /ɪ/ and /iɛ/, cf. the contrast between Spres and Spast in the case of *léisti* 'let', *veřsti* 'bring, throw down', and *kélti* 'lift': PRS.3SG/PL *léidži-a* vs. PST.3SG/PL *léid-o,* PRS.3SG/PL *veřči-a* vs. PST.ACT.PTCP-NOM.SG.F *veřt-us-i,* PRS.3SG/PL *kẽli-a* vs. PST.ACT.PTCP-NOM.SG.F *kél-us-i*. Traditionally, this case of stem consonant alternation is described as a subgroup of first conjugation in thematic vowel *-a-* (which is segmented as *-ia-* in this case, cf. Ambrazas, ed. 1997: 304f.) and not included in the chapter on morpho-phonology.

When Spast is considered, morphologically relevant palatalization and affrication can be observed in fewer cells of the paradigm compared to the case of Spres discussed above due to neutralization before front vowels. The reason for this is that palatalization/affrication of Spast only affects the mixed type verbs with suffix *-y-* in Sinf which all have the *ė*-type set of inflectional affixes (discussed in section 2.2). Thus the contrast before non-front vowels can be seen when forms of Spres are compared to the participial formations (past active participles and converbs of anteriority) based on Spast, cf. the forms of *val-ý-ti* 'clean', *ród-y-ti* 'show', and *vart-ý-ti* 'thumb, twiddle': PST.ACT.PTCP-NOM.SG.F *vãli-us-i, ródži-us-i, vařči-us-i* vs. PRS.3SG/PL *vãl-o*, *ród-o*, *vařt-o*, etc. (the opposition is neutralized by front vowels in PST.ACT.PTCP-NOM.SG.M *-ęs* and PST.ACT.PTCP.NOM.PL.M/F or PST.ACT.PTCP.N [14] in *-ę*). Palatalization/affrication can be also noticed in 1SG of past indicative of *ė*-type (cf. PST.1SG *verči-aũ*, PST.2SG *vert-eĩ*, PST.3SG/PL *veřt-ė*, etc. of *veřs-ti* 'turn over'), but it is unrelated to the palatalization/affrication of participial formations (cf. non-palatalized stem in PST.ACT.PTCP-NOM.SG.F *veřt-us-i* vs. palatalized form of PST.1SG *verči-aũ*) and has to be regarded as a feature of this particular cell of the paradigm and not a characteristic of Spast in general (cf. a similarly limited stem alternation in FUT.3SG/PL discussed in the beginning of section 2.2). Traditionally, the palatalization/affrication of Spast is described as allomorphy of participial and converbial suffix, i.e. *-us-* vs. *-ius-* (Ambrazas, ed. 1997: 334, 339).

Some verbal roots are extended by adding consonants /j/ and /v/ to resolve hiatus. First, a morpho-phonological rule can be assumed for the roots ending in vowels /eː/, /iː/, /iɛ/, and /oː/ to explain the addition of /j/ in antevocalic position, e.g.: (INF) *sė́-ti* vs. (PRS.3SG/PL) *sėj-a,* (PST.3SG/PL) *sėj-o* 'sow', *líe-ti* vs. *líej-a*, *líej-o* 'pour', *gý-ti, gỹj-a* [15], *gìj-o* 'get better, recover' (note that addition of /j/ and shortening of /iː/ in antevocalic context

are interrelated), *jó-ti* vs. *jó**j**-a*, *jó**j**-a* 'ride', etc. (Ambrazas, ed. 1997: 64, 300). It is tempting to use the same rule for the roots ending in /uɔ/ and /aʊ/, but it is not possible, since /j/ is added in Spres (antevocalic position, e.g. (INF) *liáu-ti-s* 'stop' vs. (PRS.3SG/PL) *liáu**j**-a-si*, (INF) *šlúo-ti* 'sweep' vs. (PRS.3SG/PL) *šlúo**j**-a*) while Spast (antevocalic position as well) is characterized by heterosyllabic sequences /oː-v/ or /a-v/ (cf. *li**óv**-ė-si, šl**ãv**-ė*) [16]. These cases demonstrate that the jotation of Spres can be considered as a borderline case between morpho-phonological alternation conditioned by antevocalic position and morphological addition of suffix *-j-* (i.e. *liáu-**j**-a-si, šlúo-**j**-a*, etc., cf. PRS.3SG/PL *šáu-**n**-a* 'shoot(s)', *dúo(-)**d**-a* 'give(s)' [17]), cf. a note in Andronov 2000: 45 on *j* as a submorph vs. morpho-phonological glide. A closely related but less wide-spread phenomenon is an alternation between /uː/ in anteconsonantal position vs. shortening of the vowel (/uː/ → /ʊ/) and addition of /v/ (cf. the shortening of /iː/ and addition of /j/ discussed above) in antevocalic position, e.g. *si**ū́**-ti* vs. *si**ùv**-a, si**ùv**-o* 'sew', *p**ū́**-ti* vs. *p**ū̃v**-a* [18], *p**ùv**-o* 'rot, decay', etc. [19] (cf. Ambrazas, ed. 1997: 64, 300).

Now it is worth considering the features of stems which can be considered as segmental marks (stem-forming affixes). These affixes cannot mark any morphosyntactic categories independently and have to be interpreted as characterizing stems rather than inflectional forms. First, there is a group of affixes which mark Spres (i.e. affix in Spres vs. no affix in Sinf and Spast). The most productive (i.e. wide-spread) affixes of Spres are infix *-n-* (*-m-* before /p/ and /b/) and suffix *–st-*, cf. Spres *ti-**ñ**-k-a, ta-**m̃**-p-a, tiřp-**st**-a* vs. Sinf *tìk-ti* 'be fit', *tàp-ti* 'become', *tiřp-ti* 'melt', Spast *tìk-o, tãp-o*, *tiřp-o*. The infixes in roots ending in sonorants and fricatives synchronically can be accounted for by a morpho-phonological rule of compensatory lengthening (Ambrazas, ed. 1997: 65f.) already mentioned earlier (i.e. Spres *šãl-a* ← *ša-ñ-l-a, drỹsk-a* ← *dri-ñ-sk-a* vs. Sinf *šál-ti* 'freeze (intr.)', *drìks-ti* 'tear (intr.)' and Spast *šãl-o, drìsk-o*, etc., Ambrazas, ed. 1997: 65f., 299) or apophony of long vs. short vowel is assumed (Venckutė 1981: 181f.; Akelaitienė 2001: 5f.). Suffix *-n-* is quite rare (cf. Spres *gáu-**n**-a, bū̃-**n**-a* vs. Spast *gãv-o, bùv-o*, Sinf *gáu-ti* 'get', *bū́-ti* 'be', etc.) and *-d-* is found in three verbs only (they were already mentioned earlier and a possibility of weak suppletion was considered, cf. Spres *dúo-**d**-a, dẽ-**d**-a, vér-**d**-a* vs. Spast *dãv-ė, dė́j-o, vìr-ė* and Sinf *dúo-ti* 'give', *dė́-ti* 'put', *vìr-ti* 'cook'). Finally, the suffix *-j-* has to be assumed in some cases when the alternation involving addition of /j/ cannot be explained by the morpho-phonological rule discussed earlier (cf. Spres of non-suffixal verbs like *liáu-**j**-a-si, šlúo-**j**-a* and that of suffixal verbs like *draug-áu-**j**-a, vair-úo-**j**-a* vs. Sinf *draug-áu-ti* 'be friends', *vair-úo-ti* 'steer, drive', Spast *draug-ãv-o, vair-ãv-o* analyzed below).

All affixes mentioned above (with the exception of *-j-*) are features which can characterize the non-suffixal (primary) verbs only. As it was already mentioned earlier, the mixed verbs are marked by specific suffixes appearing just in some stems. First, two main models can be distinguished. In one model, Spres has no suffix (or a zero allomorph of it, Andronov 2000: 43; Pakerys 2003: 236f.) while Sinf and Spast are characterized by suffix *-ė-/-ėj-* or *-o-/-oj-*, i.e. Spres vs. Sinf = Spast [20], e.g. *tek-**ė́**-ti, tek-a, tek-**ė́j**-o* 'flow' and *iešk-**ó**-ti*, *íešk-o, iešk-**ój**-o*, etc. (further subtypes are defined by different sets of inflectional affixes of Spres discussed in section 2.2, cf. Table 4) [21]. In another model, Sinf is characterized by suffix *-y-* while Spres and Spast have no suffix (or zero allomorph of it), i.e. Sinf vs. Spres = Spast, e.g. *dar-**ý**-ti, dãr-o, dãr-ė* 'do' (there are no further subtypes of this model). It has to be noted that although semelfactive verbs in *-(t)el-/-(t)er-* are not mentioned in the descriptions of the mixed type verbs, their inflection in Modern Lithuanian is very close to the first model, e.g. *žveĨg-ti* 'look' → *žvìlg-tel-**ė**-ti, žvìlg-tel-i, žvìlg-tel-**ėj**-o* 'have a look, cast a glance' (with apophony and metatony), cf. Pakerys 2011a. The only difference is that Sinf of these formations fluctuates between a variant with a

suffix *-ė-* and a variant without it, viz., *žvìlg-tel-ė-ti / žvìlg-tel-ti* [22]. When there is no suffix *-ė-* in Sinf, a possibility of a third model arises where Sinf and Spres have no suffix (*žvìlgtel-ti, žvìlgtel-i*) while Spast has suffix *-ėj-* (*žvìlgtel-**ėj**-o*).

To make a distinction between the suffixes *-ė-*, *-y-*, and *-o-* of the mixed type verbs and the suffixes consisting of the same vowels *-ė-*, *-y-*, and *-o-* characteristic to the suffixal type, I will use index 1 for the former ones (i.e. *-$ė_1$-*, *-y_1-*, *-o_1-*) and index 2 for the latter ones (i.e. *-$ė_2$-*, *-y_2-*, *-o_2-*). The main models of the mixed type verbs are presented in Table 1.

Table 1. *Models of the mixed type verbs according to suffix presence*

Model	**Stem**			**Example**
	Sinf	**Spres**	**Spast**	
1	suffix	no suffix	suffix	*Tek-**é**-ti, tẽk-a, tek-**ėj**-o* ‘flow’ *Iešk-**ó**-ti, íešk-o, iešk-**ój**-o* ‘search’
2	suffix	no suffix	no suffix	*Dar-**ý**-ti, dãr-o, dãr-ė* ‘do’
3	optional suffix	no suffix	suffix	*žvìlgtel(-**ė**)-ti, žvìlgtel-i, žvìlgtel-**ėj**-o* ‘cast a glance’

From the inflectional point of view, it is evident that the affixes *-$ė_1$-*, *-y_1-*, *-o_1-* differentiate the stems (the contrast can be compared to the one achieved by the root apophony, cf. Pakerys 2003: 236f.) and in a number of cases, they can be also used to predict the sets of inflectional affixes and some inflectional properties (e.g. if a verb has suffix *-y_1-* (homophonous with *-y_2-*) in Sinf, then Spres set of inflectional affixes will be of *o*-type and Spast set of inflectional affixes will be of *ė*-type and the participial forms based on Spast will be characterized palatalization/affrication of the stem; if a verb has *-$ė_1$-* or *-o_1-* in Sinf (*-$ė_1$j-*, *-o_1j-* in Spast), then Spast will have a set inflectional affixes of *o*-type, but the set of Spres will be unpredictable). This also brings our attention to the fact that suffixes *-$ė_1$-* and *-o_1-* correspond to other marks of inflection classes in Spres, while *-y_1-* corresponds to other marks of inflection classes in Spres and Spast. These other marks are sets of inflectional affixes of Spres (in the case of *-$ė_1$-* and *-o_1-*) and Spast (in the case of *-y_1-*), cf. Table 4 in section 2.2.

In the light of these facts, the criterion of paradigmatic opposition of inflection-class marks can be considered: “In the paradigm of a given lexeme, a mark of inflection-class membership may be paradigmatically opposed to another mark of inflection-class membership, but not to a mark of derivation” (Stump 2005a: 304). Just as Sanskrit *-aya* suffix is opposed to the aorist-system stems (Stump 2005a: 302), the suffixes of Lithuanian mixed type verbs are opposed to the morphological marks of Spres (1st model, suffixes *-$ė_1$-* and *-o_1-*), Spres and Spast (2nd model, suffix *-y_1-*) or Spres and (optionally) Sinf (3rd model, optional suffix *-$ė_1$-* in Sinf). This demonstrates that the suffixes of mixed type verbs in Lithuanian can be interpreted as marks of inflection classes (cf. Arkadiev 2010a). Compared to my earlier treatment (Pakerys 2003, cf. also Andronov 2000: 43), the main difference is that zero allomorphs of the suffixes are not posited [23] and the opposition between the suffixes and the sets of inflectional affixes is suggested instead.

Although the paradigmatic opposition is considered a sufficient, but not a necessary property of inflection-class marks (Stump 2005a: 303), the discussion of other criteria is still important. According to the criterion of distributional parallelism of inflection class markings, “[i]f a mark *x* of inflection-class membership appears in particular cells of the paradigm of a member of inflection class A and some contrasting mark *y* appears in the same cells of the paradigm of a member of some contrasting inflection class B, then *y*, like *x*, is a mark of inflection-class membership” (Stump 2005a: 297). If only segmental marks

of inflection classes are considered, the result of the application of this criterion is negative, since only marks of Spres (infix *-n-*, suffix *-st-*, etc.) have been independently established and no marks which would appear in Sinf and Spast or only in Sinf or Spast can be found. Note that the distribution of Sanskrit verbal suffix *-aya* is also unique compared to other marks of inflection classes (Stump 2005a: 300). On the other hand, if non-segmental marks are taken into consideration, at least some parallels for the contrast of stems can be noticed in the domain of root apophony. The 1st model of mixed type verbs is paralleled by the apophonic pattern when Sinf and Spast are characterized by mark *x*, while Spres has mark *z*, cf. the case of *pir̃kti* 'buy': Sinf/Spast *pir̃k-* (vowel /ɪ/ as mark *x*) vs. Spres *per̃k-* (vowel /ɛ/ as mark *z*). A parallel for the contrast of mark *x* in Sinf vs. mark *z* in Spres and Spast (cf. the 2nd model of mixed type verbs) is harder to find and can be exemplified by a unique case of apophony of *pùlti* 'attack' in Modern Lithuanian: Sinf *pùl-ti* (/ʊ/ as mark *x*) vs. Spres, Spast *púol-* (/uɔ/ as mark *z*) or the contrast of final /iː/, /uː/ in Sinf (*gý-ti*, *siū́-ti*) vs. /ɪ-j/, /ʊ-v/ in Spres and Spast (*gỹj-a*, *gìj-o*, *siùv-a, siùv-o*) can be considered. As far as the 3rd model of mixed type verbs is concerned (no suffix in Sinf and Spres vs. suffix in Spast), rare cases of apophony like Sinf *imm̃-ti* 'take', Spres *ìm-a* vs. Spast *ẽm-ė* or a more widespread pattern of the type Sinf *kél-ti* 'lift, raise', Spres *kẽli-a* vs. Spast *kél-ė* can be considered.

Some lexemes with suffixes *-ė$_1$-*, *-y$_1$-*, and *-o$_1$-* are derived (e.g. *gul-é-ti, gùl-i, gul-ėj-o* 'lie' ← *gul̃-ti* 'lie down'; *kraip-ý-ti*, *kraĩp-o*, *kraĩp-ė* 'shake, twist' ← *kreĩp-ti* 'turn'; *klū́p-o-ti*, *klū́p-o*, *klū́p-oj-o* 'be on one's knees' ← *klaũp-ti(-s), klaũpi-a(-si), klaũp-ė(-si)* 'kneel down'; note root apophony and metatony in the latter two cases) and thus the criterion of uniformity of derivational marking is worth considering: "Marks of derivation are associated with whole lexemes, and therefore occur on all of a derived lexeme's stems; [...]. Marks of inflection-class membership, by contrast, are associated with individual stems, and may therefore be associated with some of the stems in a lexeme's paradigm but not others; that is, their appearance may well be sensitive to differences among the morphosyntactic property sets associated with the various cells in a lexeme's inflectional paradigm" (Stump 2005a: 304). The criterion of uniformity of derivational marking is directly related to the criterion of paradigmatic opposition of inflection-class markings and since all suffixes of the mixed type verbs are absent from some of the stems, it can be concluded again they are inflection-class marks. It has to be noted that probably the suffix gaps in the paradigms of the mixed type verbs are responsible for the notes in Urbutis 1978: 143, 199f., Ambrazas, ed. 1985: 186, Ambrazas, ed. 2006: 282, etc. which qualify these affixes as related to the inflectional system in one way or another (note a later addition of suffix *-uoti* in Ambrazas, ed. 1997: 221) [24].

To sum up, suffixes of the mixed type verbs can be interpreted as marks of inflection classes according to the criteria of paradigmatic opposition and uniformity of derivational marking, while the criterion of distributional parallelism gives a negative answer (if only segmental marks as possible parallels are taken into consideration). These marks are employed in the domain of stems and have to be differentiated from the sets of inflectional affixes discussed in section 2.2 which are also involved in marking of inflection classes. It has to be noted in advance that in the domain of inflectional affixes, thematic suffixes (traditionally referred to as thematic vowels) may be also segmented. The segmentation of these elements is not straightforward (cf. the notes in section 2.2), but if their segmentation is accepted, two groups or layers of inflection-class (thematic) suffixes have to be distinguished. The first one would include inflection-class suffixes discussed in this paper, while the second one would consist of the traditional thematic vowels. If thematic vowels are rejected, only one layer of inflection-class suffixes is needed.

Let us now consider the question of the suffixal verbs. First, derivationally analyzable cases can be considered, so that the segmentation of suffixes is clear, e.g.: *ger-**é**-ti, ger-**éj**-a, ger-**éj**-o* 'become better' (← *gẽr-as* 'good'), *dal-**ý**-ti, dal-**ìj**-a, dal-**ìj**-o* 'divide' (← *dal-ìs* 'part'), *dovan-**ó**-ti, dovan-**ój**-a, dovan-**ój**-o* 'make a present' ← *dovan-à* 'present', *uog-**áu**-ti, uog-**áu**-j-a, uog-**ãv**-o* 'gather berries' (← *úog-a* 'berry'), *vair-**úo**-ti, vair-**úo**-j-a, vair-**ãv**-o* 'drive, steer' (← *vaĩr-as* 'steering wheel'), *mãž-**in**-ti*, *mãž-**in**-a, mãž-**in**-o* 'decrease' (← *mãž-as* 'small'), *pur-**én**-ti, pur-**ẽn**-a, pur-**ẽn**-a* 'loosen' (← *pur-ùs* 'loose') [25]. It is quite obvious that these suffixes show derivational opposition, cf. the criterion of semantic contrast between derived stems and their bases: "A mark of derivation signals a particular semantic relation between two lexemes. A mark of inflection-class membership does not, in itself, signal a particular semantic relation between two lexemes" (Stump 2005a: 297). The criterion of uniformity of derivational marking (which is directly related to the criterion of paradigmatic opposition) would not suggest the inflectional interpretation of these affixes either. On the other hand, it has to be noted that these criteria do not exclude the possibility of inflectional function of the suffixes under consideration (Stump 2005a: 299, 303).

First of all, one may note that these suffixes show morpho-phonological variation which is directly related to the expression of opposition of some stems, cf. *vair-**úo**-ti, vair-**úo**-j-a* vs. *vair-**ãv**-o* (Sinf and Spres vs. Spast) or *dovan-**ó**-ti, dovan-**ój**-a, dovan-**ój**-o*, etc. These alternations are conditioned by anteconsonantal (mostly in Sinf, but also in Spres in the case of *-au-* and *-uo-*) and antevocalic (in Spast and Spres, except for *-au-* and *-uo-* where suffix *-j-* has to be assumed) contexts [26] and one also has to note that the same alternations [27] affect the non-suffixal (primary) verbs, cf. some examples which were already mentioned earlier: *s**é**-ti* 'sow' vs. *s**éj**-a, s**éj**-o*, *l**ý**-ti* 'rain' vs. *l**ỹ**j-a* (/i:/ due to infixation or apophony), *l**ìj**-o*, *j**ó**-ti* 'ride' vs. *j**ój**-a, j**ój**-o*, *g**áu**-ti* 'get', *g**áu**-n-a, g**ãv**-o*, *šl**úo**-ti* 'sweep', *šl**úo**-j-a, šl**ãv**-ė*, etc. This demonstrates that according to stem alternation features, the suffixal verbs can be grouped together with some types of non-suffixal (primary) verbs and that the alternating form of these suffixes (just like the root alternations of nonsuffixal verbs) shows some distinctions between the stems. Thus, it can be concluded that these alternations do not affect the results of the application of criteria of distinction between inflection-class marks and derivation marks discussed above.

An interesting observation comes from the integration of verbs with unfitting properties, which is typically used to determine the productivity of inflection classes (Wurzel 1989: 158–163). In the present day Modern Lithuanian, new verbal borrowings from English are typically accommodated by adding suffix *-in-ti*, e.g.: *browse → bráuz-in-ti* (*-in-a, -in-o*), *download → daunlaũd-in-ti (-in-a, -in-o)*, *save → seĩv-in-ti* (*-in-a, -in-o*), etc. In some cases, the derivational interpretation is possible, but it has to be secondary (i.e. both verb and noun are first borrowed and only later a possible derivational relationship arises), e.g.: (*to*) *chat → čẽt-in-ti* (*-in-a, -in-o*) vs. *(a) chat → čẽt-as*, *google → gūgl-in-ti* (*-in-a, -in-o*) vs. *Google → gūgl-as*, etc. In the realm of the so-called internationalisms, the majority of verbs are integrated by adding the suffix *-uo-ti* (*-uo-j-a, -av-o*), e.g. [28]: *aprob-úo-ti* 'approbate, approve' (cf. Latin *approbāre*), *damask-úo-ti* 'disclose, unmask' (cf. French *démasquer*), *renov-úo-ti* 'renovate' (cf. Latin *renovāre*), *verb-úo-ti* 'recruit' (cf. German *werben*), etc. (cf. Ulvydas, ed. 1971: 249). These cases may show that suffixes *-in-* and *-uo-* are treated like inflection-class marks used to integrate loans, but this observation (presented in Pakerys 2011b) has to be addressed with caution. The typological study of verbal borrowings has shown that morphosyntactic adaptation of verbal borrowings follows a number of paths. In the case of indirect insertion (i.e. when affixes are used for the morphosyntactic accommodation of loans), a language may use a (denominal) verbalizer, a causative/factitive affix or a special loan verb marker (Wohlgemuth 2009:

94ff.). In the case of direct insertion, there is no morphological adaptation, but one has to note that some languages assign the verbal borrowings to certain inflection classes by adding inflection class markers (Wohlgemuth 2009: 91ff.). I cannot discuss Lithuanian verbal borrowings in detail here, but it has to be noted that suffix *-in-* can be considered a productive causative/factitive marker, while *-uo-* is the most frequent (denominal) verbalizer. This means that the test of loan integration only shows the productivity of Spres of *a*-type and Spast of *o*-type, while *-in-* and *-uo-* have to be regarded as derivational affixes which are used as loan verb accommodation devices in the strategy of indirect insertion.

It has to be noted that sometimes the suffixes of the suffixal verbs may be also segmented in derivationally non-transparent verbs by comparing them to other lexemes sharing the same root, as suggested by Urbutis (1978: 199), cf. *gam-ìn-ti* 'produce' alongside *gam-ýb-a* 'production', *gam-ykl-à* 'factory, plant' and *gam-in-ỹs* 'product' [29]. It has to be acknowledged that the identification of the meaning of such suffixes may be problematic (in the case of *gam-ìn-ti*, one may suggest that *-in-* is related to transitivity).

To sum up the results of section 2.1, the domain of stems provides two types of inflection-class features. The first type covers non-segmental morpho-phonological alternations, while the second type includes segmental marks (some of which also show morpho-phonological variation). Compared to the traditional account, the role of suffixes of the mixed verbs is emphasized and it is suggested that they are marks of inflection classes and their derivational function manifests itself only through the assignment of derived lexemes to these classes. The suffixes of the suffixal verbs can be segmented in derivationally analyzable verbs and also in some derivationally non-analyzable items, but their status as inflection-class marks was not proven. The test of loan verb integration has demonstrated that suffixes *-in-* and *–uo-* are productive accommodation devices which select (and show the productivity of) *a*-type set of inflectional affixes of Spres and *o*-type set of Spast.

This leads us to the conclusion that the status of the suffixal type of verbs is quite problematic from the inflectional point of view and possibly unnecessary in the description of inflection-class system of Lithuanian verb. Nevertheless, one has to recognize a predictive value of these phonological strings ("quasi-suffixes" [30]) which correspond to (and usually historically are) derivational suffixes, and the rules like this one can be formulated: "if Sinf ends in a string /ɪn/, /ɛn/, /aʊ/ or /uɔ/ and there is a syllable before it which is not a prefix, the verb will select the *a*-type set of inflectional affixes of Spres and the *o*-type set of Spast and the strings /aʊ/ or /uɔ/ will be augmented by /j/ (*-j-*) in Spres and will alternate with /av/ in Spast, etc." This way one may speak of inflection classes of verbs characterized by certain stem alternations, sets of inflectional affixes and prosodic features, such as *_áu-ti, _áu-j-a, _ãv-o* [31] (e.g. *skaláu-ti, _áu-j-a, _ãv-o* 'rinse') vs. *_áu-ti, _áu-n-a, _óv-ė* (e.g. *šáu-ti, šáu-n-a, šóv-ė* 'shoot'), *_ý-ti, _ìi-a, _ìi-o* (e.g. *pel-ý-ti, ìi-a, ìi-o* 'grow moldy') vs. *_ý-ti, _ỹj-a, _ìi-o* (e.g. *lý-ti, lỹj-a, lìi-o* 'rain'), *_úo-ti, _úo-j-a, _ãv-o* (e.g. *kamúo-ti, _úo-j-a, -ãv-o* 'torment') vs. (unique feature sets exemplified by) *šlúo-ti, šlúo-j-a, šlãv-ė* 'sweep' and *dúo-ti, dúo(-)d-a, dãv-ė* 'give', etc.

2.2. The domain of inflectional affixes. To form finite and non-finite forms, the stems discussed in section 2.1 have to be further modified by addition of certain sets of inflectional affixes with possible morpho-phonological alternation of the stems due to phonological properties of these affixes (cf. the notes above on anteconsonantal and antevocalic contexts). It has to be noted that in some cases, the sets of inflectional affixes and the features of stems discussed in 2.1 are closely interrelated, i.e. if a lexeme has stems of type A, then it is assigned the set of inflectional affixes of type *a* in Spres and the set of

inflectional affixes of type *b* in Spast, etc. Sometimes, the sets of inflectional affixes themselves are also interrelated (i.e. if Spres has set of type *a,* then the set of Spast will be of type *b*) (cf. Ambrazas, ed. 1997: 291–296). There are also some cases when the relations of stems and inflectional affixes are unpredictable.

Compared to the segmental elements discussed in section 2.1, the sets of inflectional affixes discussed here are different, since the segmentation of a mark which would be recurrent in all forms of particular stem is quite problematic. The variation of sets of inflectional affixes will be discussed in ascending order of complexity starting with Sinf and then turning to Spast and Spres.

Finite and non-finite forms based on Sinf have the same set of inflectional affixes for all verbs and show no variation, except for one stem alternation of FUT.3SG/PL. It is a feature of the inflection class of verbs with the Sinf ending in /uː/ and /iː/ (where /iː/ is not an inflection-class suffix and belongs to the root), like *bū́-ti* 'be'*, gý-ti* 'get better, recover', etc. To form FUT.3SG/PL of these verbs, a stem with a short vowel /ɪ/ or /ʊ/ is used, cf. *bù-s, gì-s* vs. FUT.1SG *bū́-siu, gý-siu*, FUT.2SG *bū́-si, gý-si*, etc. (Ambrazas, ed. 1997: 313). An exception to this rule is verbs *siū́-ti* 'sew' and *vý-ti* 'drive, chase', cf. FUT.3SG/PL *siūs, vỹs* characterized by metatony.

As far as sets of inflectional affixes (or inflection classes) of Spast are concerned, traditionally two types are distinguished: the "*ė*-type" and the "*o*-type" (Ambrazas, ed.) 1997: 309–311). The elements *-ė-* and *-o-* (traditionally referred to as "thematic vowels") can be easily segmented in PST.3SG/PL, PST.1PL, and PST.2PL, but less so in PST.1SG and PST.2SG (if suffixes of 1SG *-u* and 2SG *-i* are assumed, morpho-phonological rules have to be used to derive these forms from the underlying ones containing *-ė-* and *-o-*, cf. the forms of *veĩ̃k-ti* 'cry, weep' and *bė́g-ti* 'run': PST.1SG *bė́g-au* ← *bėg-**o**-u*, *verki-aũ* ← *verk-**ė**-u* (Ambrazas, ed. 1997: 63f., 296, 309, 311). Moreover, the segments *-ė-* and *-o-* are absent from past active participles and converbs of anteriority which are based on Spast (note that the formation of these forms shows no difference between the *ė*-type and the *o*-type and only palatalization/affrication differentiates the participial forms of the class with the suffix *-y_1-*). Thus the status of *-ė-* and *-o-* as potential marks (i.e. thematic suffixes/vowels) of corresponding sets of inflectional affixes is not unproblematic (cf. Table 2).

Table 2. *Fragments of the paradigms of Spast (*veĩ̃k-ti *'cry, weep' and* bė́g-ti *'run'). In bold: potential segmental marks (theme vowels)*

Form	**Set of inflectional affixes**	
	***ė*-type**	***o*-type**
Past indicative		
1SG	*verki-**a**-ũ* (←*-**ė**-u*)	*bė́g-**a**-u* (←*-**o**-u*)
2SG	*verk-**e**-ĩ̃* (← *-**ė**-i*)	*bė́g-**a**-i* (←*-**o**-i*)
3 SG/PL	*veĩ̃k-**ė***	*bė́g-**o***
1PL	*veĩ̃k-**ė**-me*	*bė́g-**o**-me*
2PL	*veĩ̃k-**ė**-te*	*bė́g-**o**-te*
Participial forms		
PST.ACT.PTCP-NOM.SG.F	*veĩ̃k-us-i*	*bė́g-us-i*
CVB.ANT	*veĩ̃k-us*	*bė́g-us*

For the sake of brevity, I will not discuss the distribution of sets of affixes of Spast of non-suffixal (primary) verbs (cf. the notes in Ambrazas, ed. 1997: 292–295). As far as the mixed and suffixal verbs are concerned, the distribution is straightforward, since they all have the *o*-type, except for the class in *-y_1-* which has *ė*-type (it is also characterized by palatalization/affrication of participial forms).

The variety of sets of inflectional affixes of Spres is more complex. Traditionally, three conjugations are distinguished characterized by the so-called theme vowels *-a-, -i-,* and *-o-* (Ambrazas 1997: 298–307). The theme vowels may be considered as potential marks of inflection classes and can be identified in more cases compared to the sets of Spast, namely in the forms of active and passive participles, converbs of simultaneity in *-nt-* and in PRS.3SG/PL, PRS.1PL and PRS.2PL (cf. Table 3). It has to be noted that morpho-phonological rules are required to explain the absence of theme vowels in PRS.1SG and PRS.2SG of types in *-a-* and *-i-* and a change of *-o-* to *-a-* has to be assumed for conjugation in *-o-* in PRS.1SG and PRS.2SG as well as in formation of participles and converbs of simultaneity in *-nt-* (Ambrazas, ed. 1997: 63f., 296, 329, 339f.). Thus their status as possible marks of inflection classes is stronger than that of segments in the sets of inflectional affixes of Spast, but weaker compared to thematic suffixes discussed in section 2.1 which can be easily segmented in all cases.

Table 3. *Fragments of the paradigms of Spres (*nèš-ti *'carry',* myl-é-ti *'love',* žin-ó-ti *'know'). In bold: potential segmental marks (theme vowels)*

Form	**Set of inflectional affixes**		
	***a*-type**	***i*-type**	***o*-type**
Present indicative			
1SG	*neš-ù* (←*-**a**-u*)	*mýli-u* (←*-**i**-u*)	*žin-**a**-ũ* (←*-**o**-u*)
2SG	*neš-ì* (←*-**a**-i*)	*mýl-i* (←*-**i**-i*)	*žin-**a**-ĩ* (←*-**o**-i*)
3SG/PL	*nẽš-**a***	*mýl-**i***	*žìn-**o***
1PL	*nẽš-**a**-me*	*mýl-**i**-me*	*žìn-**o**-me*
2PL	*nẽš-**a**-te*	*mýl-**i**-te*	*žìn-**o**-te*
Participial forms			
PRS.ACT.PTCP-NOM.SG. F	*nẽš-**a**-nt-i*	*mýl-**i**-nt-i*	*žìn-**a**-nt-i* (←*-**o**-nt-i*)
PRS.PASS.PTCP-NOM.SG.F	*nẽš-**a**-m-a*	*mýl-**i**-m-a*	*žìn-**o**-m-a*
CVB.SIM (in *-nt-*)	*nẽš-**a**-nt*	*mýl-**i**-nt*	*žìn-**a**-nt* (←*-**o**-nt*)

The distribution of sets of affixes of mixed and suffixal verbs is as follows. All suffixal verbs have *a*-type set of affixes for Spres, while the sets for mixed verbs vary. Mixed verbs in *-ė$_1$-* get either *a*-type set, or *i*-type (mixed verbs with optional *-ė$_1$-* in Sinf mostly select *i*-type in Modern Lithuanian and Spres *a*-type with palatalization/affrication is very rare, cf. Pakerys 2011a: 9). Mixed verbs in *-o$_1$-* have either *a*-type set, or *o*-type set, while the mixed verbs in *-y$_1$-* have *o*-type set only, cf. Table 4.

Table 4. *Sets of inflectional affixes of Spres and Spast of the mixed type verbs*

Inflection-class suffix (Sinf, Spres, Spast)	**Set of inflectional affixes**		**Example**
	Spres	**Spast**	
-ė-, –, -ėj-	a	o	*tek-é-ti, tẽk-a, tek-éj-o* 'flow' [32]
-ė-, –, -ėj-	i	o	*tik-é-ti, tìk-i, tik-éj-o* 'believe'
-o-, –, -oj-	a	o	*gied-ó-ti, gíed-a, gied-ój-o* 'chant'
-o-, –, -oj-	o	o	*žin-ó-ti, žìn-o, žin-ój-o* 'know' [33]
-y-, –, –	o	ė	*dar-ý-ti, dãr-o, dãr-ė* 'do' [34]
(-ė-), –, -ėj-	i	o	*žvìlgtel(-ė-)ti, žvìlgtel-i, žvìlgtel-ėj-o* 'cast a glance'

As far as relations between inflection-class suffixes and sets of inflectional affixes are concerned, it has to be noted that the set of *i*-type of Spres is compatible with *-ė$_1$-* only, while the set of *o*-type (of Spres) is attested in combinations with *-y$_1$-* and *-o$_1$-*. Both the *i*-type and the *o*-type sets of Spres are incompatible with inflection-class suffixes of the suffixal verbs (i.e. *-ė$_2$-, -y$_2$-, -o$_2$-, -au-, -uo-, -en-,* and *-in-*). The set of *a*-type of Spres and the sets of affixes for Spast (*ė*- and *o*-type) cannot be used to predict inflection-class suffixes since these sets also characterize non-suffixal (primary) verbs (on the other hand, note that palatalization/affrication in participial forms of Spast clearly points to *-y$_1$-*).

To sum up, the features of inflection classes of the mixed type and the suffixal verbs can be described as follows. The inflectional classes of mixed verbs are characterized by inflection-class suffixes (some of which are affected by certain morpho-phonological alternations), palatalization/affrication of some stems and a full array of sets of inflectional affixes (i.e. Spres of *a*-, *i*-, and *o*-type, Spast of *ė*- and *o*-type). The suffixal verbs (if they are recognized as a separate structural type) demonstrate certain morpho-phonological alternations of their stems and are characterized by *a*-type set of inflectional affixes of Spres and *o*-type set of Spast.

3. Derivation by assignment to inflection class and selection of inflection classes by derivational affixes. According to the interpretation presented in section 2.1, the suffixes *-ė$_1$-*, *-y$_1$-*, and *-o$_1$-*, are inflection-class marks. This brings certain changes to the interpretation of derivational system of Lithuanian verbs. First of all, the derivational function of these suffixes can be seen only in the rules which assign derivatives to certain inflection classes (Stump 2005a: 299), i.e. these suffixes have a double function [35]. An alternative approach would be to posit zero derivational affixes in these cases, but this solution would blur the fact that the derivational contrast can be marked by the assignment to inflection class (note that the assignment to certain inflection class can be also followed by additional marks, such as apophony and metatony). The interpretation of *-ė$_1$-*, *-y$_1$-*, *-o$_1$-* as inflection-class marks is also different from my earlier suggestion that these suffixes are a case of derivational affixes of a variable form (cf. Pakerys 2003 and 2010). The question of the variable form of derivational affixes cannot be addressed here, but the analysis of Lithuanian mixed type verbs shows that if an affix marks the derivational contrast and is absent from some stems or has a variable form, this variation has to be due to inflection-class properties or other inflectional features of the language (cf. Ricca 2005: 204–209 on the problem of cumulation between derivation and inflection).

In what follows, I will briefly review the types of verbs derived by assignment to inflection class vs. suffixation which, of course, also presupposes assignment to certain inflection class.

3.1. ***-ė-ti, -a, -ėj-o***. The majority of verbs belonging to this class are not derivationally analyzable, except for some lexemes which are based on verbs and interjections, e.g.: *čiršk-é-ti*, *čìršk-a*, *čiršk-éj-o* ‘chirp (iterative)’ ← *čiřkš-ti*, *čiřški-a*, *čiřšk-ė* ‘chirp (durative)’, *bamb-é-ti*, *bámb-a*, *bamb-éj-o* ‘grumble’ ← (interjection) *bám-bám-bám* (the derived verb is based on a full syllable of the interjection and the first consonant of it) (Ulvydas, ed. 1971: 240). There are no derivational suffixes which assign the derivatives to this class and three non-derived verbs belong to a subtype of this class with palatalization/affrication (see footnote 33).

3.2. ***-ė-ti, -i, -ėj-o***. A group of verbs belonging to this class can be interpreted as derived statives, e.g.: *av-ė́-ti*, *ãv-i*, *av-ė́j-o* 'wear shoes' ← *aũ-ti-s*, *aũ-n-a-si*, *ãv-ė-si* 'put on shoes', *gul-ė́-ti*, *gùl-i*, *gul-ė́j-o* 'lie' ← *gulė̃-ti(-s)*, *gùl-a(-si)*, *gùl-ė(-si)* 'lie down' (cf. Ulvydas, ed. 1971: 241; Ambrazas, ed. 2006: 399). There is also a group of the so-called diminutive verbs (denoting actions of short duration) which are characterized by prefix *pa-* and the inflection class *-ė-ti*, *-i*, *-ėj-o*, e.g. *pa-bėg-ė́-ti*, *pa-bė̃g-i*, *pa-bėg-ė́j-o* 'run a little bit' (note metatony) ← *bė́g-ti*, *bė́g-a*, *bė́g-o* 'run' (in some cases, Spres can be in *-ėj-a*) (Ulvydas, ed. 1971: 241). Some deadjectival verbs with the stative meaning also belong to this class, cf. *šykšt-ė́-ti*, *šỹkšt-i*, *šykšt-ė́j-o* 'be stingy' : *šykšt-us* 'stingy'.

This inflection class can be selected by derivational suffix ***-s-*** to derive iterative verbs, cf. *link-s-ė́-ti*, *lìnk-s-i*, *link-s-ė́j-o* 'nod (repeatedly)' ← *lẽnk-ti*, *leñki-a*, *leñk-ė* 'bend, incline' (note apophony and metatony). Some derivatives can be interpreted as related to both, verbs and interjections, cf. *kark-s-ė́-ti*, *kárk-s-i*, *kark-s-ė́j-o* 'croak (iterative)' alongside *kañk-ti*, *kañki-a*, *kañk-ė* 'croak (durative)' and interjection *kár-kár-kár* (Ulvydas, ed. 1971: 242).

Few derivationally analyzable verbs have suffix ***-d-***, which selects the class in *-ė-ti*, *-i* and marks iterative or prolonged action, cf.: *skél-d-ė-ti*, *skél-d-i*, *skél-d-ėj-o* 'get multiple cracks' ← *skìl-ti*, *skỹl-a*, *skìl-o* 'split, crack (intr.)', *mér-d-ė-ti*, *mér-d-i*, *mér-d-ėj-o* 'be dying in agony' ←*miř-ti*, *mìr-št-a*, *mìr-ė* 'die' (note apophony in both derivatives and metatony in the latter one). It has to be noted that the inflection of Spres of these verbs fluctuates between *-i* and *-ėj-a* in Modern Lithuanian (the latter one is indicated as the main type in Ulvydas, ed. 1971: 259 alongside *-i* and even *-a*).

3.3. ***-(ė-)ti, -i, -ėj-o.*** Only semelfactives in *-(t)el-* or (less frequently) *-(t)er-* are assigned to this class, cf. *šū́k-tel(-ė)-ti*, *šū́k-tel-i*, *šū́k-tel-ėj-o* 'give a cry, scream' (with apophony and metatony) ← *šaũk-ti*, *šaũki-a*, *šaũk-ė* 'scream'. Although the grammars and dictionaries mostly list Spres in *-ėj-a* or *-ia* (i.e. *a*-type with palatalization/affrication) for these verbs (Ulvydas, ed. 1971: 259f.; Ambrazas, ed. 2006: 400f.), there is a strong preference for Spres of *i*-type in Modern Lithuanian, as it has been already noted above.

3.4. ***-o-ti, -a, -oj-o***. This class has three verbs only and all of them are non-derived: *gied-ó-ti*, *gíed-a*, *gied-ój-o* 'chant', *mieg-ó-ti*, *miẽg-a*, *mieg-ój-o* 'sleep', *raud-ó-ti*, *ráud-a*, *raud-ój-o* 'sob, weep' (Ulvydas, ed. 1971: 238).

3.5. ***-o-ti, -o, -oj-o***. A group of derived statives (cf. 3.2) is assigned to this class, cf. *klū́p-o-ti*, *klū́p-o*, *klū́p-oj-o* 'be on one's knees' (apophony + metatony) ← *klaũp-ti(-s)*, *klaũpi-a(-si)*, *klaũp-ė(-si)* 'kneel down' (Ulvydas, ed. 1971: 243). Some verbs with the same derivational meaning can be derived by suffixation of ***-s-*** which assigns them to the same inflection class [36], cf. *dryb-s-ó-ti*, *drỹb-s-o*, *dryb-s-ój-o* 'lie lazily' (with apophony) vs. *drìb-ti*, *dri-m̃-b-a*, *drìb-o* 'tumble, fall down' (Ulvydas, ed. 1971: 243; Ambrazas, ed. 2006: 400).

3.6. ***-y-ti, -o, -ė***. Derivationally analyzable verbs in this class usually are either iteratives (cf. *bad-ý-ti*, *bãd-o*, *bãd-ė* 'stick into repeatedly' ← *bès-ti*, *bẽd-a*, *bẽd-ė* 'stick into'), or causatives (cf. *mirk-ý-ti*, *miřk-o*, *miřk-ė* 'wet, soak (trans.)' ← *miřk-ti*, *miřk-st-a*, *miřk-o* 'soak (intr.)' (note root apophony in both cases) (Ulvydas, ed. 1971: 244f.).

There are two derivational suffixes selecting inflection class in *-y-ti, -o, -ė*. Suffix ***-d-*** is used to derive causative and iterative formations, e.g. (note apophony in both cases): *gìr-d-y-ti*, *gìr-d-o*, *gìr-d-ė* 'give (somebody) to drink' ←*gér-ti*, *gẽri-a*, *gér-ė*, *spar-d-y-ti*, *spar-d-o*, *spar-d-ė* 'kick repeatedly' ← *spìr-ti*, *spìri-a*, *spýr-ė* 'kick' (Ulvydas, ed. 1971: 245f.; Ambrazas, ed. 2006: 397, 399). Suffix ***-st-*** is found in iterative formations only, e.g. *bar-st-ý-ti*, *bař-st-o*, *bař-st-ė* 'strew repeatedly' (with apophony) ← *beř-ti*, *bẽri-a*, *bẽr-ė* (Ulvydas, ed. 1971: 246; Ambrazas, ed. 2006: 396).

The main conclusion to be drawn from this brief review is that the verbal derivation by assignment to inflection class is a marginal and non-productive process in Modern Lithuanian and the marking of derivational contrast by specialized derivational affixes is preferred.

4. Conclusions

The system of inflection classes of Lithuanian verbs can be interpreted as defined by features belonging to three domains, viz., (1) of stems, (2) of inflectional affixes, and (3) of prosodic features. The domain of stems provides inflection-class features from two subdomains. The first one specifies morpho-phonological alternations of the stems, while the second one stores information on segmental marks. The domain of inflectional affixes specifies the sets of morphological exponents of present and past stems.

The suffixes of the mixed type verbs *-ė$_1$-, -y$_1$-,* and *-o$_1$-* can be regarded as marks of inflection classes according to the criteria of paradigmatic opposition and uniformity of derivational marking, but their distribution is unparalleled by other segmental marks of inflection classes. The status of suffixes of the suffixal verbs cannot be established as that of inflection-class marks by directly applying the criteria of distributional parallelism, paradigmatic opposition, and uniformity of derivational marking. When verbal borrowings are taken into account, it can be demonstrated that suffixes *-in-* and *-uo-* are used to integrate recent or relatively recent loan verbs into the inflectional system of Lithuanian. This test shows the productivity of *-in-* and *-uo-* as loan verb accommodation devices, but it has not led to the conclusion that they are segmental marks of inflection classes.

The inflection-class suffixes of the mixed type verbs have to be differentiated from the traditionally segmented theme vowels. If they are recognized despite certain difficulties of their segmentation, two groups (or layers) of suffixal inflection-class marks have to be distinguished. The first one includes inflection-class suffixes discussed in this paper, while the second one covers the traditional thematic vowels. If thematic vowels are not postulated, only one layer of inflection-class suffixes is needed.

The recognition of suffixes *-ė$_1$-, -y$_1$-,* and *-o$_1$-* as inflection-class marks also affects the interpretation of some derived verbs. The derivationally analyzable lexemes characterized by these suffixes have to be interpreted as derived by assignment to certain inflection classes (additional non-segmental marks of derivation are also possible), and the inflection-class suffixes have to be differentiated from purely derivational morphemes which select the former ones when a derivative is formed.

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[1] As far as reflexive formations are concerned, it has to be noted that the reflexive affix is suffixal (placed in the word-final slot) in unprefixed verbs and unprefixed forms and prefixal in prefixed verbs and prefixed forms (placed in the slot immediately before the root or the first lexical prefix if there are two of them). I thank one of the reviewers for drawing my attention to the cases with two lexical prefixes (cf. *pri-si-pa-žìn-ti* 'confess', *iš-si-par-dúo-ti* 'sell out (intr.)').

[2] The verbal suffixes are usually presented with the suffix *-ti* which marks the infinitive. To provide more details on the inflection of the verb, all three "main" stems have to be listed (cf. the notes below).

[3] The notions of primary, mixed, and suffixal verbs are explained at the beginning of section 2.

[4] See Arkadiev 2010b on a variable degree of morphomic character of these stems and on the need to postulate a separate past passive participle stem. I will not discuss this stem since it does not alter the morphological interpretation of the mixed and the suffixal verbs.

[5] The abbreviations of category labels are taken from the list provided in Leipzig Glossing Rules (available online at http://www.eva.mpg.de/lingua/resources/glossing-rules.php) with some additions (ACT – active, ANT – anteriority, SIM – simultaneity).

[6] In the domain of inflectional affixes, the traditional thematic vowels may be segmented, but their segmentation is not straightforward and they do not appear in participial forms based on Spast (cf. section 2.2). As a result, these elements are not treated in this paper as a part of the stem (cf. Arkadiev 2010b).

[7] Notes on verbal accentuation can be found in Ambrazas, ed. 1997: 309, 311f., 313–316, 331, 333, 335, 337f., 341, 343f., 346f., 349, 351.

[8] The traditional practice of Lithuanian linguistics is to list three stems in infinitive (marked by suffix *-ti*), present indicative 3SG/PL (marked by certain theme vowel/suffix of Spres, in this case, of *a*-type; the types of Spres and Spast are reviewed in section 2.2 below) and past indicative 3SG/PL forms (marked by certain theme vowel/suffix of Spast, in this case, of *o*-type). For the sake of brevity, the grammatical abbreviations of these forms will usually be omitted.

[9] The term "non-suffixal" is preferred to "primary" in this paper to avoid the implication of derivational status of the verb (i.e. "primary" vs. "derived", cf. Pakerys 2003: 239).

[10] The stems can also be differentiated by suppletion, which is attested in one verb only, cf. Sinf *bū́-(ti)* 'be', Spast *bùv-(o)* (the difference of these stems is accounted for by a morpho-phonological rule discussed below) vs. PRS.3SG/PL *yrà* and *ẽs-* in other forms based of Spres. Some borderline instances of weak stem suppletion (cf. Veselinova 2006: 47) can also be considered, cf. Spres *dẽ**d**-a*, *dúo**d**-a*, *vér**d**-a* vs. Sinf *dė́-ti* 'put', *dúo-ti* 'give', *vìr-ti* 'cook', Spast *dė́j-o*, *dãv-ė*, *vìr-ė* (alternatively, a non-productive suffix *-d-* of Spres may be suggested characterizing just three verbs mentioned here; the case of allomorphy of Spast *dė́j-* and *dãv-* is discussed later).

[11] Or, alternatively, no underlying infixed form is postulated and root apophony is assumed (cf. below on infix *-n-* with further references).

[12] The addition of /j/ and /v/ is discussed below.

[13] The change of /t/ and /d/ to /tʃ/ and /dʒ/, respectively.

[14] Note that neuter forms are not inflected for case and number.

[15] Compensatory lengthening (← *gi-ñ-j-a*) or apophonic alternation (/iː/ vs. /ɪ/) has to be assumed in Spres.

[16] A heterosyllabic treatment of diphthong in antevocalic position is also found in a small group of verbs with Sinf ending in /ʊɪ/, cf. (in syllabic segmentation) *gùi-ti*, *gù-ja*, *gù-jo* 'drive, turn out; maltreat'.

[17] These and some other affixes of Spres are discussed below. Note that *dúod-a* can be also considered as a case of weak suppletion already mentioned in footnote 11.

[18] Compensatory lengthening (← *pu-ñ-v-a*) or apophonic alternation (/uː/ vs. /u/).

[19] As an exception, the vowel is not shortened in Spast *džiū́v-o* (Sinf *džiū́-ti*, Spres *džiū́-st-a* / *džiū̃-v-a* (← *džiu-ñ-v-a* or apophony /uː/ vs. /u/) 'get/grow dry').

[20] The equality sign means that both stems have suffixes.

[21] The alternation Sinf *-ė-*, *-o-* vs. Spast *-ėj-* /*-oj-* involves addition of /j/ governed by a morpho-phonological rule discussed above.

[22] Shorter variants may be preferred over the longer ones (cf. 1 million word corpus data in Pakerys 2011a: 11) due to the possible iconic association (short form as a reflection of short action), cf. Akelaitienė 1997: 53ff. on iconicity of short and long vowels in derived verbs in Lithuanian.

[23] Cf. also Andronov 2008 with critical remarks with respect to zero allomorphy in the mixed type verbs.

[24] Suffix *-uoti* is also mentioned in Ambrazas, ed. 2006: 282, but it has to be a misprint instead of *-oti*, since explicit reference to the mixed type verbs is made. The wording "later addition" is used here in respect to the first edition of Ambrazas, ed. 2006 which was published in 1994, followed by Ambrazas, ed. 1997.

[25] Deverbal derivation is also possible in this case, but the base verb *pùr-ti*, *pū̃r-a*, *pùr-o* 'become loose, fluffy' is rare.

[26] Most of the alternations were already discussed earlier (the contrast *-ė-*, *-y-*, *-o-* vs. *-ėj-*, *-ij-*, *-oj-*, the alternation between *-au-*, *-uo-* and *-a-v-*). The suffixes *-en-* and *-in-* have homosyllabic allomorphs in anteconsonantal position (Sinf) vs. heterosyllabic treatment in antevocalic position (Spres, Spast). In Ambrazas, ed. 1997: 290, the attention is drawn to the alternations of suffixes *-uo-ti*, *-au-ti*, and *-y-ti* only.

[27] Minor differences can only be noticed in Spres and are due to different affixes (or apophony in one case).

[28] For the sake of simplicity, I have only indicated the ultimate sources of these verbs. A separate study would certainly reveal more details, since many internationalisms have reached Lithuanian via Polish and Russian.

[29] Suffix *-in-* in *-in-ys* is not related to the verbal suffix, cf. *brė́ž-ti* 'draw' → *brėž-in-ỹs* 'drawing.

[30] Usually referred to as *baigmenys* in Lithuanian linguistics.

[31] The underscore symbol (_) stands for "stem ends in". The prosodic features marked here are only relevant in the cases when the stress falls on the final syllable of the stem.

[32] A subtype with palatalization/affrication of Spres is distinguished consisting of three verbs: *kent-ė́-ti*, *keñ**či**-a*, *kent-ė́j-o* 'suffer', *kvep-ė́-ti*, *kvẽ**pi**-a*, *kvep-ė́j-o* 'smell (intr.)', *reik-ė́-ti*, *reĩ**ki**-a*, *reik-ė́j-o* 'need'.

[33] If one accepts the segmentation of thematic vowel *-o-* in Spres, it would be tempting to identify it with the inflection class suffix *-o-* of Sinf and Spast (i.e. *žin-ó-*). Note, however, that the functional status of *-o-* in Spres is much closer to that of (possibly segmentable) thematic vowel in the set affixes of Spast of *o*-type (cf. Table 2).

[34] With palatalization/affrication of Spast, cf. PST.ACT.PTCP-NOM.SG.F *da**ri**-us-i*.

[35] On the derivation by assignment to inflection class and the use of inflectional markers for derivation, cf. also Aronoff 1994: 126–130, Beard 2001: 62f., Stump 2005b: 64f., Aikhenvald 2007: 37f. Cf. also Urbutis 1978: 199 on the double function of the suffixes of Lithuanian mixed type verbs.

[36] Note that there are some homophonous suffixes selecting different inflection class suffixes and sets of inflectional affixes to express different derivational meanings: *-**d**-ė-ti*, *-**d**-i,* *-**s**-ė-ti*, *-**s**-i* (cf. 3.2) and *-**s**-o-ti*, *-**s**-o*, *-**d**-y-ti*, *-**d**-o*, *-**d**-ė* (cf. 3.6).

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