

Пробный вариант грамматики предложных конструкций (на примере рубрики локализации)

Предлагается вариант контекстно-свободной порождающей грамматики, который описывает порождение основных типов предложных конструкций. Двухуровневая аффиксальная порождающая грамматика гибридного типа AGFL [Koster, Cornelis HA. "Affix grammars for natural languages" In: Attribute Grammars, Applications and Systems. P. 358-373. Springer, Berlin, Heidelberg, 1991] (https://en.wikipedia.org/wiki/Affix_grammar) позволяет включать в генерацию данные о частотных соотношениях предложных конструкций, смысловых типах их синтаксических доминант и зависимых слов. Грамматика включает несколько модулей: модуль аффиксов (структур типа признак-значение) и правила порождения - в нашем случае правила порождения предложных конструкций современного русского языка с учетом линейного порядка слов, их грамматических типов и форм.

Модуль аффиксов.

При записи грамматики используется определенная система соглашений.

1. Нетерминалы — признаки аффиксы, которые используются для дальнейшего «развертывания» (уточнения) в правилах порождения, обозначаются заглавными.
2. Терминалы — значения грамматических признаков, не имеющих дальнейшего уточнения в онтологии грамматики, обозначаются строчными.
3. Удвоение двоеточия отделяет левую часть правила порождения от правой части продукции.
4. Вертикальная черта в правой части правила имеет значение невзаимоисключающего «или», то есть объединения нескольких вариантов развертывания правой части с учетом корпусной статистики реализации параметров.
5. Система аффиксов иерархически организована: существует только один путь от вершины онтологии (RUBRIC) до терминального элемента (например locative1).

```

                                                    /* АФФИКСЫ */
# R_meta.gra - AGFL grammar defining globally used affixes.
#
                                                    /* ГРАММАТИЧЕСКИЕ КЛАССЫ И ЗНАЧЕНИЯ */
CASE :: genitive | locative | locative2 | accusative | accusative2 | ablative | dative.
NUMBER :: sg | pl.
GENDER :: masc | fem | neut.

                                                    /* СЕМАНТИЧЕСКИЙ ПРЕДЛОЖНЫЙ РУБРИКАТОР */
RUBRIC :: LOCALIZATION | TEMPORATIVE | OBJECTIVE | DERIVATIVE | QUALITATIVE | PARTITIVE | QUANTIFICATIVE.

                                                    /* РУБРИКАТОР СИНТАКСЕМ ЛОКАЛИЗАЦИИ*/
LOCALIZATION :: LOCATIVE | DIRECTIVE | DEPARTIVE | TRANSITIVE.

LOCATIVE :: locative1 | locative2 | locative3 | locative4 | locative5 | locative6.
DIRECTIVE :: directive1 | directive2 | directive3 | directive4 | directive5.
DEPARTIVE :: departive1 | departive2 | departive3 | departive4 | departive5.
TRANSITIVE :: transitive1 | transitive2 | transitive3.

                                                    /* РУБРИКАТОР СУБСИНТАКСЕМ ТЕМПОРАТИВА*/
TEMPORATIVE :: TEMPORAL | ASPECTIVE | TAXIS.

TEMPORAL :: temporal1 | temporal2 | temporal3 | temporal4 | temporal5.
ASPECTIVE :: aspective1 | aspective2 | aspective3 | aspective4.
TAXIS :: taxis1 | taxis2 | taxis3.

                                                    /* РУБРИКАТОР СЕМАНТИЧЕСКИЙ СЕМАНТИЧЕСКИХ ТИПОВ СЛОВ */
#=====/* РУБРИКАТОР СЕМАНТИЧЕСКИХ ТИПОВ СЛОВ */=====
MOVE :: ENTITY | ABSTRACT | EVENT | STATE.
ENTITY :: PLACE1 | PLACE2 | OBJECT | BODY_PART | ORGANISM | HUMAN | ANIMAL | PLANT | INSTRUMENT | SUBSTANCE.
ABSTRACT :: TIME | CONCEPT | QUALITY | GROUP | QUANTITY.
=====/* РУБРИКАТОР СЕМАНТИЧЕСКИХ ТИПОВ ЛЕКСИКАЛИЗАЦИИ СОБЫТИЙ */=====
EVENT :: BE | CHANGE | MAKE | ACT | REMOVE | COVER.
BE :: EXIST | POSITION |
ACT :: MOVE | DO |
MOVE :: LOCOMOTE | DISPLACE.
LOCOMOTE :: HEAD | ROLL.
HEAD :: WALK | RUN |
TRAVEL :: DIRECTIONAL | OMNIDIRECTIONAL.
STATE :: MENTAL_STATE | PHIS_STATE | POSS_STATE
MENTAL_STATE :: THINK | KNOW | COMPREHEND | PERCEIVE | REMEMBER | PSYCH_FEEL.
PHIS_STATE :: BE | PHIS_FEEL |
```

POSS_STATE :: HAVE | GET.

#=====/* РУБРИКАТОР СЕМАНТИЧЕСКИХ ТИПОВ ЛЕКСИКАЛИЗАЦИИ ВРЕМЕНИ */=====

TIME :: PERIODS | MOMENTS | TIME_POINT | DURATION.

PERIODS :: TIME_UNIT | TIME_LIFE.

TIME_UNIT :: EPOCH | CENTURY | YEAR | MONTH.

MOMENTS :: WEEK | HOUR.

TIME_POINT :: DATE | BEGINNING | ENDING.

/* _____ */

/* ПОРОЖДАЮЩАЯ ГРАММАТИКА ПРЕДЛОЖНЫХ КОНСТРУКЦИЙ */

/* ОДНА ПРЕДЛОЖНО-ПАДЕЖНАЯ ГРУППА */

#=====/* РАЗВЕРТЫВАНИЕ РУБРИК */=====

prepositional_phrase (RUBRIC): prepositional_phrase (LOCALIZATION);
prepositional_phrase (TEMPORATIVE);
prepositional_phrase (OBJECTIVE);
prepositional_phrase (DERIVATIVE);
prepositional_phrase (QUALITATIVE);
prepositional_phrase (PARTITIVE);
prepositional_phrase (QUANTIFICATIVE).

#=====/* РАЗВЕРТЫВАНИЕ СИНТАКСЕМ ЛОКАЛИЗАЦИИ */=====

prepositional_phrase (LOCALIZATION): prepositional_phrase (LOCATIVE);
prepositional_phrase (DIRECTIVE);
prepositional_phrase (DEPARTIVE);
prepositional_phrase (TRANSITIVE).

_____ /* РАЗВЕРТЫВАНИЕ СИНТАКСЕМ ЛОКАТИВА */ _____

prepositional_phrase (LOCATIVE): prepositional_phrase (locative1);
prepositional_phrase (locative2);
prepositional_phrase (locative3);
prepositional_phrase (locative4);
prepositional_phrase (locative5);
prepositional_phrase (locative6).

_____ /* РАЗВЕРТЫВАНИЕ СИНТАКСЕМ ДИРЕКТИВА */ _____

prepositional_phrase (DIRECTIVE): prepositional_phrase (directive1);
prepositional_phrase (directive2);
prepositional_phrase (directive3);
prepositional_phrase (directive4);
prepositional_phrase (directive5).

_____ /* РАЗВЕРТЫВАНИЕ СИНТАКСЕМ ДЕПАРТИВА */ _____

prepositional_phrase (DEPARTIVE): prepositional_phrase (departive1);
prepositional_phrase (departive2);
prepositional_phrase (departive3);
prepositional_phrase (departive4);
prepositional_phrase (departive5).

_____ /* РАЗВЕРТЫВАНИЕ СИНТАКСЕМ ТРАНЗИТИВА */ _____

prepositional_phrase (TRANSITIVE): prepositional_phrase (transiive1);
prepositional_phrase (transiive2);
prepositional_phrase (transiive3).

#=====/* ПРАВИЛА ПОРОЖДЕНИЯ ПРЕДЛОЖНЫХ КОНСТРУКЦИЙ ДЛЯ СУБСИНТАКСЕМ ЛОКАТИВА */=====

prepositional_phrase (locative1): head(SEM_TYPE), "в"|"во", noun_phrase (locative|locative1, PLACE1);
"в"|"во", noun_phrase (locative|locative1, PLACE1), head(SEM_TYPE).

prepositional_phrase (locative2): head(SEM_TYPE), "на", noun_phrase (locative|locative1, PLACE2);
"на", noun_phrase (locative|locative1, PLACE2), head(SEM_TYPE).

prepositional_phrase (locative3): head(SEM_TYPE), "у"|"возле"|"около", noun_phrase (genitive, PLACE1|PLACE2);
"у"|"возле"|"около", noun_phrase (genitive, PLACE1|PLACE2), head(SEM_TYPE).

prepositional_phrase (locative3): head(SEM_TYPE), "под", noun_phrase (ablative, PLACE1|PLACE2);
"под", noun_phrase (ablative, PLACE1|PLACE2), head(SEM_TYPE).

prepositional_phrase (locative4): head(SEM_TYPE), "за", noun_phrase (ablative, PLACE1|PLACE2) / SEM_TYPE=ACT;
"за", noun_phrase (ablative, PLACE1|PLACE2), head(SEM_TYPE) / SEM_TYPE=ACT.

prepositional_phrase (locative5): head(SEM_TYPE), "под", noun_phrase (ablative, PLACE1|PLACE2);
"под", noun_phrase (ablative, PLACE1|PLACE2), head(SEM_TYPE).

prepositional_phrase (locative6): verboid (OMNIDIRECTIONAL), "по", noun_phrase (dative, PLACE1|PLACE2);
"по", noun_phrase (dative, PLACE1|PLACE2), verboid (OMNIDIRECTIONAL).

#===== КОМБИНАТОРИКА СУБСИНТАКСЕМ =====

prepositional_phrase (LOCATIVE): head(SEM_TYPE), "на", noun_phrase (locative|locative1, PLACE2), "в"|"во", noun_phrase (locative|locative1, PLACE1).
head(SEM_TYPE), "на", noun_phrase (locative|locative1, PLACE2), "за", noun_phrase (ablative, PLACE1|PLACE2).
head(SEM_TYPE), "по", noun_phrase (ablative, PLACE2, "в"|"во", noun_phrase (locative|locative1, PLACE1).

#=====/* ПРАВИЛА ПОРОЖДЕНИЯ ПРЕДЛОЖНЫХ КОНСТРУКЦИЙ ДЛЯ СУБСИНТАКСЕМ ДИРЕКТИВА*/=====

prepositional_phrase (directive1): verboid(MOVE), "в"|"во", noun_phrase (accusative, PLACE1);
"в"|"во", noun_phrase (accusative, PLACE1), verboid(MOVE).

prepositional_phrase (directive2): verboid(MOVE), "на", noun_phrase (accusative, PLACE2);
"на", noun_phrase (accusative, PLACE2), verboid(MOVE).

prepositional_phrase (directive3): verboid(MOVE), "к"|"ко", noun_phrase (dative, PLACE1|PLACE2);
verboid(MOVE), "до", noun_phrase (genitive, PLACE1|PLACE2);
"к"|"ко", noun_phrase (dative, PLACE1|PLACE2), verboid(MOVE).
"до", noun_phrase (genitive, PLACE1|PLACE2), verboid(MOVE).

prepositional_phrase (directive4): verboid(MOVE), "за", noun_phrase (accusative, PLACE1|PLACE2);
"за", noun_phrase (accusative, PLACE1|PLACE2), verboid(MOVE).

prepositional_phrase (directive5): verboid(MOVE), "под"|"подо", noun_phrase (accusative, PLACE1|PLACE2);
"под"|"подо", noun_phrase (accusative, PLACE1|PLACE2), verboid(MOVE).

#=====/* ПРАВИЛА ПОРОЖДЕНИЯ ПРЕДЛОЖНЫХ КОНСТРУКЦИЙ ДЛЯ СУБСИНТАКСЕМ ДЕПАРТИВА*/=====

prepositional_phrase (departive1): verboid(MOVE), "из"|"изо", noun_phrase (genitive, PLACE1);
"из"|"изо", noun_phrase (genitive, PLACE1), verboid(MOVE).

prepositional_phrase (departive2): verboid(MOVE), "с"|"со", noun_phrase (genitive, PLACE2);
"с"|"со", noun_phrase (genitive, PLACE2), verboid(MOVE).

prepositional_phrase (departive3): verboid(MOVE), "от"|"ото", noun_phrase (genitive, PLACE1|PLACE2);
"от"|"ото", noun_phrase (genitive, PLACE1|PLACE2), verboid(MOVE).

prepositional_phrase (departive4): verboid(MOVE), "из-за", noun_phrase (genitive, PLACE1|PLACE2);
"из-за", noun_phrase (genitive, PLACE1|PLACE2), verboid(MOVE).

prepositional_phrase (departive5): verboid(MOVE), "из-под", noun_phrase (genitive, PLACE1|PLACE2);
"из-под", noun_phrase (genitive, PLACE1|PLACE2), verboid(MOVE).

#=====/* ПРАВИЛА ПОРОЖДЕНИЯ ПРЕДЛОЖНЫХ КОНСТРУКЦИЙ ДЛЯ СУБСИНТАКСЕМ ТРАНЗИТИВА*/=====

prepositional_phrase (transitive1): verboid(MOVE), "по", noun_phrase (genitive, PLACE1);
"из"|"изо", noun_phrase (genitive, PLACE1), verboid(MOVE).

prepositional_phrase (transitive2): verboid(MOVE), "через", noun_phrase (genitive, PLACE2);
"с"|"со", noun_phrase (genitive, PLACE2), verboid(MOVE).

prepositional_phrase (transitive3): verboid(MOVE), "от"|"ото", noun_phrase (genitive, PLACE1|PLACE2);
"от"|"ото", noun_phrase (genitive, PLACE1|PLACE2), verboid(MOVE).

```

#=====/* РУБРИКАТОР СЕМАНТИЧЕСКИХ ТИПОВ ЛЕКСИКАЛИЗАЦИИ ВРЕМЕНИ */=====
# TIME :: PERIODS | MOMENTS | TIME_POINT | DURATION.
# PERIODS :: TIME_UNIT | TIME_LIFE.
# TIME_UNIT :: EPOCH | CENTURY | YEAR | MONTH.
# MOMENTS :: WEEK | HOUR.
# TIME_POINT :: DATE | BEGINNING | ENDING.

#=====/* РАЗВЕРТЫВАНИЕ СИНТАКСЕМ ТЕМПОРАТИВА */=====
prepositional_phrase (TEMPORATIVE): prepositional_phrase (TEMPORAL);
prepositional_phrase (ASPECTIVE);
prepositional_phrase (TAXIS).

#_____/* РАЗВЕРТЫВАНИЕ ТЕМПОРАЛЬНЫХ СИНТАКСЕМ ТЕМПОРАТИВА */_____
prepositional_phrase (TEMPORAL): prepositional_phrase (temporal1);
prepositional_phrase (temporal2);
prepositional_phrase (temporal3);
prepositional_phrase (temporal4);
prepositional_phrase (temporal5).

#_____/* РАЗВЕРТЫВАНИЕ АСПЕКТУАЛЬНЫХ СИНТАКСЕМ ТЕМПОРАТИВА */_____
prepositional_phrase (ASPECTIVE): prepositional_phrase (aspective1);
prepositional_phrase (aspective2);
prepositional_phrase (aspective3);
prepositional_phrase (aspective4).

#_____/* РАЗВЕРТЫВАНИЕ ТАКСИНЫХ СИНТАКСЕМ ТЕМПОРАТИВА */_____
prepositional_phrase (TAXIS): prepositional_phrase (taxis1);
prepositional_phrase (taxis2);
prepositional_phrase (taxis3).

#=====/* ПРАВИЛА ПОРОЖДЕНИЯ ПРЕДЛОЖНЫХ КОНСТРУКЦИЙ ДЛЯ ТЕМПОРАЛЬНЫХ СУБСИНТАКСЕМ */=====
prepositional_phrase (temporal1): head(SEM_TYPE), "в"|"во", noun_phrase (locative|locative1, PERIODS);
"в"|"во", noun_phrase (locative|locative1, PERIODS), head(SEM_TYPE).

prepositional_phrase (locative2): head(SEM_TYPE), "в"|"во", noun_phrase (accusative, MOMENTS);
"в"|"во", noun_phrase (accusative, MOMENTS), head(SEM_TYPE).

prepositional_phrase (locative3): head(SEM_TYPE), "за", noun_phrase (accusative, PERIODS|MOMENTS);
"за", noun_phrase (accusative, PERIODS|MOMENTS), head(SEM_TYPE);
head(SEM_TYPE), "в течение", noun_phrase (genitive, PERIODS|MOMENTS);
"в течение", noun_phrase (genitive, PERIODS|MOMENTS), head(SEM_TYPE).

prepositional_phrase (locative4): head(SEM_TYPE), "за", noun_phrase (ablative, PERIODS|MOMENTS);
"за", noun_phrase (ablative, PERIODS|MOMENTS), head(SEM_TYPE).
head(SEM_TYPE), "во время", noun_phrase (genitive, PERIODS|MOMENTS);
"во время", noun_phrase (genitive, PERIODS|MOMENTS), head(SEM_TYPE).

prepositional_phrase (locative5): head(SEM_TYPE), "на", noun_phrase (accusative, DATE);
"на", noun_phrase (accusative, DATE), head(SEM_TYPE).

#=====/* ПРАВИЛА ПОРОЖДЕНИЯ ПРЕДЛОЖНЫХ КОНСТРУКЦИЙ ДЛЯ АСПЕКТУАЛЬНЫХ СУБСИНТАКСЕМ */=====
prepositional_phrase (aspective1): head(SEM_TYPE), ["на срок",] "до", noun_phrase (genitive, PERIODS|MOMENTS);
head(SEM_TYPE), "к"|"ко", noun_phrase (dative, PERIODS|MOMENTS);
head(SEM_TYPE), "в конце", noun_phrase (genitive, PERIODS|MOMENTS);
head(SEM_TYPE), "под", noun_phrase (accusative, PERIODS|MOMENTS);
"до", noun_phrase (genitive, PERIODS|MOMENTS), head(SEM_TYPE);
"к"|"ко", noun_phrase (dative, PERIODS|MOMENTS), head(SEM_TYPE);
"в конце", noun_phrase (genitive, PERIODS|MOMENTS), head(SEM_TYPE);
"под", noun_phrase (accusative, PERIODS|MOMENTS), head(SEM_TYPE).

prepositional_phrase (aspective2): head(SEM_TYPE), "за", noun_phrase (accusative, PERIODS|MOMENTS);
head(SEM_TYPE), "по", noun_phrase (accusative, PERIODS|MOMENTS);
head(SEM_TYPE), "на", noun_phrase (accusative, PERIODS|MOMENTS);
head(SEM_TYPE), "в период", noun_phrase (genitive, PERIODS|MOMENTS);

```

```
"за", noun_phrase (accusative, PERIODS|MOMENTS), head(SEM_TYPE);
"по", noun_phrase (accusative, PERIODS|MOMENTS), head(SEM_TYPE);
"на", noun_phrase (accusative, PERIODS|MOMENTS), head(SEM_TYPE);
"в период", noun_phrase (genitive, PERIODS|MOMENTS), head(SEM_TYPE).
```

```
prepositional_phrase (aspective3): head(SEM_TYPE), "с"|"со", noun_phrase (genitive, PERIODS|MOMENTS);
head(SEM_TYPE), "от", noun_phrase (genitive, PERIODS|MOMENTS);
head(SEM_TYPE), "в начале", noun_phrase (genitive, PERIODS|MOMENTS);
"с"|"со", noun_phrase (genitive, PERIODS|MOMENTS), head(SEM_TYPE);
"от", noun_phrase (genitive, PERIODS|MOMENTS), head(SEM_TYPE);
"в начале", noun_phrase (genitive, PERIODS|MOMENTS), head(SEM_TYPE).
```

```
prepositional_phrase (aspective4): head(SEM_TYPE), "по", noun_phrase (ablative, PERIODS|MOMENTS);
"по", noun_phrase (ablative, PERIODS|MOMENTS), head(SEM_TYPE).
```

#===== КОМБИНАТОРИКА СУБСИНТАКСЕМ =====

```
prepositional_phrase (ASPECTIVE): head(SEM_TYPE), "с"|"со", noun_phrase (genitive, PERIODS|MOMENTS), "по", noun_phrase (accusative, PERIODS|MOMENTS);
head(SEM_TYPE), "с"|"со", noun_phrase (genitive, PERIODS|MOMENTS), "до", noun_phrase (accusative, PERIODS|MOMENTS);
head(SEM_TYPE), ["на срок",] "от", noun_phrase (genitive, PERIODS|MOMENTS), "до", noun_phrase (accusative, PERIODS|MOMENTS).
```

#=====/* ПРАВИЛА ПОРОЖДЕНИЯ ПРЕДЛОЖНЫХ КОНСТРУКЦИЙ ДЛЯ ТАКСИСНЫХ СУБСИНТАКСЕМ*/=====

```
prepositional_phrase (taxis1): head(SEM_TYPE), "после", noun_phrase (genitive, DURATION);
head(SEM_TYPE), "через", noun_phrase (accusative, PERIODS|MOMENTS);
head(SEM_TYPE), "спустя", noun_phrase (genitive, PERIODS|MOMENTS);
head(SEM_TYPE), noun_phrase (genitive, PERIODS|MOMENTS), "спустя";
"после", noun_phrase (genitive, DURATION), head(SEM_TYPE);
"через", noun_phrase (accusative, PERIODS|MOMENTS), head(SEM_TYPE).
```

```
prepositional_phrase (taxis2): head(SEM_TYPE), "при", noun_phrase (locative, DURATION);
"при", noun_phrase (locative, DURATION), head(SEM_TYPE).
```

```
prepositional_phrase (taxis3): head(SEM_TYPE), "до", noun_phrase (genitive, TIME);
head(SEM_TYPE), "перед", noun_phrase (genitive, TIME);
"до", noun_phrase (genitive, TIME), head(SEM_TYPE);
"перед", noun_phrase (genitive, TIME), head(SEM_TYPE).
```

#===== КОМБИНАТОРИКА СУБСИНТАКСЕМ =====

```
prepositional_phrase (TAXIS): head(SEM_TYPE), "через", noun_phrase (accusative, PERIODS|MOMENTS), "после", noun_phrase (genitive, DURATION);
"через", noun_phrase (accusative, PERIODS|MOMENTS), "спустя", noun_phrase (genitive, DURATION);
"через", noun_phrase (accusative, PERIODS|MOMENTS), noun_phrase (genitive, DURATION), "спустя".
```

#=====/* ПРАВИЛА РАЗВЕРТЫВАНИЯ ГЛАВНЫХ СЛОВ ПРЕДЛОЖНОЙ КОНСТРУКЦИИ*/=====

```
head(SEM_TYPE): verboid (EVENT);
pred_adjective (STATE);
concrete_noun (ENTITY).
```

```
verboid (EVENT): finite_verb (EVENT);
participle (EVENT);
verbal_noun (EVENT).
```

#=====/* ПРАВИЛА РАЗВЕРТЫВАНИЯ */=====

```
noun_phrase (CASE, SEM_TYPE): noun (CASE, NUMBER, GENDER, SEM_TYPE);
adjective (CASE, NUMBER, GENDER), [adjective2 (CASE, NUMBER, GENDER),] noun (CASE, NUMBER, GENDER);
noun (CASE, NUMBER, GENDER, SEM_TYPE), [adjective2 (CASE2, NUMBER2, GENDER2),] noun2 (gen, NUMBER1, GENDER1, SEM_TYPE1)
noun (CASE, NUMBER, GENDER, SEM_TYPE), prepositional_phrase (RUBRIC).
```