Anuvṛtti

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Anuvṛtti

अनुवृत्ति : Anuvṛtti: Recurrence

The concept is very close to factorisation in Mathematics.

a*b + a*c = a* (b+c)

Languages also use this phenomenon in the form of 'sharing' of arguments. For example, consider following two sentences.

Ram went home.
Ram slept.

These two sentences can be combined into a single sentence, sharing the Subject as

Ram went home and slept.

Anuvṛtti

Panini has used Anuvṛtti to the maximum extent possible so as to bring in brevity in the system.

The function of 'Anuvṛtti' is to relate preceeding rules of a domain to its following rules. That is it allows a controlled reading of a former rule, or part of a former rule, in the interpretation or application of a subsequent rule. It thus helps reconstruct the shared context of a given rule within a domain. (Rama Nath Sharma; The Aṣṭādhyāyi of Pāṇini, Vol I, pp 44-45)

Anuvṛtti

Consider the rule

acaḥ karmakarttari 3.1.62

Meaning: after something ending in ac (a vowel), which is followed by a karmakartṛ.

In order to understand this sūtra, we need the following borrowings.

- pratyayaḥ 3.1.1
- paraśca 3.1.2
- dhātoḥ 3.1.22
- cli liṅi 3.1.43
- cleḥ sic 3.1.44
- ciṇ te 3.1.60
- ... anyatarasyām 3.1.62

Complete sūtra now is

pratyayaḥ paraś ca dhātoḥ luṅi ciṇ te anyatarasyām acaḥ karmakarttari

Anuvṛtti ...

Complete sūtra now is
pratyayaḥ paraś ca dhātoḥ luṅi ciṇ te anyatarasyām acaḥ karmakarttari

which means

ajantād dhātoḥ parasya cleḥ pratyayasya karmakarttari taśabde parataḥ ciṇādeśaḥ bhavati anyatarasyām

Affix CLI optionally is replaced by CIṆ when the former occurs after a verb root ending in AC (a vowel) and when ta, a replacement of LUṆ which denotes karmakarattari (object treated as if agent) follows.

Anuvṛtti

Consider the following sūtras:

- *upadeśe ac anunāsik it* 1.3.2
  उपदेशे अच् अनुनासिक इत्
- *hal antyam* 1.3.3
  हल् अन्त्यम्
- *na vibhaktau tusmāḥ* 1.3.4
  न विभक्तौ तुस्मा
- *ādiḥ ñiṭuḍavāḥ* 1.3.5
  आदिः ञिटुडवः
- *ṣaḥ pratyayasya* 1.3.6
  षः प्रत्ययस्य
- *cuṭū* 1.3.7
  चुटू
- *laṣaku ataddhite* 1.3.8
  लशकु अतद्धिते

Anuvṛtti

These sūtras after borrowing the necessary words from previous sūtras expand to

- *upadeśe ac anunāsik it* 1.3.2
  उपदेशे अच् अनुनासिक इत्
  The nasalised (अनुनासिक) vowels(अच्) are इत् in original enunciation (उपदेश).
- **upadeśe** *hal antyam* **it** 1.3.3
  उपदेशे हल् अन्त्यम् इत्
  In उपदेश , the final consonant (हल्) is इत्
- **upadeśe** *na vibhaktau tusmāḥ* **it** 1.3.4
  उपदेशे न विभक्तौ तुस्माः इत्
  The final dental consonants (तु) and the final स् and म् are not इत् in affixes called विभक्ति
- **upadeśe** *ādiḥ ñiṭuḍavāḥ* **it** 1.3.5
  उपदेशे आदिः ञिटुडवः इत्
  The initial ञि, टु, डु are इत्

Anuvṛtti

- **upadeśe ādiḥ** *ṣaḥ pratyayasya* **it** 1.3.6
  उपदेशे आदिः षः प्रत्ययस्य इत्
  The initial ष् of an affix is इत्
- **upadeśe ādiḥ pratyayasya** *cuṭū* **it** 1.3.7
  उपदेशे आदिः प्रत्ययस्य चुटू इत्
  The initial palatals (चु) and linguals (टु) of an affix are इत्
- **upadeśe ādiḥ pratyayasya** *laśaku ataddhite* **it** 1.3.8
  उपदेशे आदिः प्रत्ययस्य लशकु अतद्धिते इत्
  The initial ल् and श् and the gutturals (कु) of all affixes, except तद्धित are इत्

Anuvṛtti

Introduce variables for words

- *upadeśe(A) ac(B) anunāsik(C) it(D)* 1.3.2
  उपदेशे अच् अनुनासिक इत्
- **upadeśe(A)** *hal antyam (E)* **it (D)** 1.3.3
  उपदेशे हल् अन्त्यम् इत्
- **upadeśe(A)** *na vibhaktau tusmāḥ(F)* **it (D)** 1.3.4
  उपदेशे न विभक्तौ तुस्मा इत्
- **upadeśe(A)** *ādiḥ(G) ñiṭuḍavāḥ(H)* **it (D)** 1.3.5
  उपदेशे आदिः ञिटुडवः इत्
- **upadeśe(A) ādiḥ(G)** *ṣaḥ(I) pratyayasya(J)* **it (D)** 1.3.6
  उपदेशे षः प्रत्ययस्य इत्
- **upadeśe(A) ādiḥ(G) pratyayasya(J)** *cuṭū(K)* **it (D)** 1.3.7
  उपदेशे चुटू इत्
- **upadeśe(A) ādiḥ(G) pratyayasya(J)** *laṣaku ataddhite(L)* **it (D)** 1.3.8
  उपदेशे लशकु अतद्धिते इत्

Anuvṛtti

After removing the text, we have

- A B C D (1.3.2)
- A E D (1.3.3)
- A F D (1.3.4)
- A G H D (1.3.5)
- A G I J D (1.3.6)
- A G J K D (1.3.7)
- A G J L D (1.3.8)

Anuvṛtti

Treating each of the sūtras as one term in a mathematical expression, and the set of sūtras as sum of the terms, we can simplify the above expression as follows.

A B C D + A E D + A F D + A G H D + A G I J D + A G J K D + A G J L D

$\rightarrow$

A (B C + E + F + G H + J [I + K + L]) D

Writing each term again on separate line, we get

- A B C D
- E
- F
- G H
- I J
- K
- L

Anuvṛtti

Replacing each variable by the corresponding word, we get the Ashtadhyayi sūtras.

- *upadeśe(A) ac(B) anunāsik(C) it(D)* 1.3.2
  उपदेशे अच् अनुनासिक इत्
- *hal antyam(E)* 1.3.3
  हल् अन्त्यम्
- *na vibhaktau tusmāḥ(F)* 1.3.4
  न विभक्तौ तुस्माः
- *ādiḥ(G) ñiṭuḍavāḥ(H)* 1.3.5
  आदिः ञिटुडवः
- *ṣaḥ(I) pratyayasya(J)* 1.3.6
  षः प्रत्ययस्य
- *cuṭū(K)* 1.3.7
  चुटू
- *laṣaku ataddhite(L)* 1.3.8
  लशकु अतद्धिते

Anuvṛtti: Another example

Here the words borrowed from previous sūtras are in parenthesis.

- 6-1-87 ād guṇaḥ (saṃhitāyām aci ekaḥ pūrvaparayoḥ)
- 6-1-88 vṛddhiḥ eci (saṃhitāyām ekaḥ pūrvaparayoḥ ād)
- 6-1-89 etyedhatyūṭhsu (saṃhitāyām ekaḥ pūrvaparayoḥ ād vṛddhiḥ eci)
- 6-1-90 āṭaḥ ca (saṃhitāyām aci ekaḥ pūrvaparayoḥ vṛddhiḥ)
- 6-1-91 upasargāt ṛti dhātau (saṃhitāyām ekaḥ pūrvaparayoḥ ād vṛddhiḥ)
- 6-1-92 vā supi āpiśaleḥ (saṃhitāyām ekaḥ pūrvaparayoḥ ād vṛddhiḥ upasargāt ṛti dhātau)
- 6-1-93 ā ot amśasoḥ (saṃhitāyām aci ekaḥ pūrvaparayoḥ)
- 6-1-94 eṅi pararūpam (saṃhitāyām ekaḥ pūrvaparayoḥ ād upasargāt dhātau)

Anuvṛtti: Another example

Assigning variables to various words:

- 6-1-87 ād(d) guṇaḥ(e) saṃhitāyām(a) aci(b) ekaḥ pūrvaparayoḥ(c)
  आद्(d) गुणः(e) संहितायाम्(a) अचि(b) एकः पूर्वपरयोः(c)
- 6-1-88 vṛddhiḥ(ṅ) eci(g) saṃhitāyām(a) ekaḥ pūrvaparayoḥ(c) ād(d)
  वृद्धिः(f) एचि(g) संहितायाम्(a) एकः पूर्वपरयोः (c) आद् (d)
- 6-1-89 etyedhatyūṭhsu(h) saṃhitāyām(a) ekaḥ pūrvaparayoḥ(c) ād(d) vṛddhiḥ(ṅ) eci(g)
  एत्येधत्यूठ्सु(h) संहितायाम्(a) एकः पूर्वपरयोः(c) आद्(d) वृद्धिः(f) एचि(g)
- 6-1-90 āṭaḥ ca(i) saṃhitāyām(a) aci(b) ekaḥ pūrvaparayoḥ(c) vṛddhiḥ(ṅ)
  आटः च(i) संहितायाम्(a) अचि(b) एकः पूर्वपरयोः(c) वृद्धिः(f)

Anuvṛtti: Another example

Contd ...

- 6-1-91 upasargāt(j) ṛti(k) dhātau(l) saṃhitāyām(a) ekaḥ pūrvaparayoḥ(c) ād(d) vṛddhiḥ(ṅ)
  उपसर्गात्(j) ऋति(k) धातौ(l) संहितायाम्(a) एकः पूर्वपरयोः(c) आद्(d) वृद्धिः(f)
- 6-1-92 vā supi āpiśaleḥ(m) saṃhitāyām(a) ekaḥ pūrvaparayoḥ(c) ād(d) vṛddhiḥ(ṅ) upasargāt(j) ṛti(k) dhātau(l)
  वा सुपि आपिशलेः(m) संहितायाम्(a) एकः पूर्वपरयोः(c) आद्(d) वृद्धिः(f) उपसर्गात्(j) ऋति(k) धातौ(l)
- 6-1-93 ā ot amśasoḥ(n) saṃhitāyām(a) aci(b) ekaḥ pūrvaparayoḥ (c)
  आ ओत् अम्शसोः(n) संहितायाम्(a) अचि(b) एकः पूर्वपरयोः (c)
- 6-1-94 eṅi pararūpam(o) saṃhitāyām (a) ekaḥ pūrvaparayoḥ (c) ād (d) upasargāt(j) dhātau (l)
  एङि पररूपम्(o) संहितायाम् (a) एकः पूर्वपरयोः (c) आद् (d) उपसर्गात्(j) धातौ(l)

Anuvrtti

- a b c d e
- a c d f g
- a c d f g h
- a b c f i
- a c d f j k l
- a c d f j k l m
- a b c n
- a c d j l o

Anuvrtti

a	b	c	d	e				
a	(b)	c	d	f	g			
a	(b)	c	d	f	g	h		
a	b	c	(d)	f	i			
a	(b)	c	d	f	j	k	l	
a	(b)	c	d	f	j	k	l	m
a	b	c			(j)		(l)	n
a	(b)	c	d		j		l	o

Anuvrtti

$$a\ b\ c\ [\ d\ (e + f\{g\ (1 + h) + i + jl(\ k\ (1 + m)\} + n + o)]$$

Anuvṛtti

Anuvṛtti is different from the mathematical factorisation in following respects.

- Not necessarily properly nested
- The beginning of the parenthesis is explicit, but the end is not marked explicitly.
- There are some cases where the anuvṛtti is in the backward direction. That is words from the following sūtras are to be considered for proper understanding of the sūtras.
- In some cases the recurrence of words are not required for one sūtra but are required for the following sūtra. So the words recurr skipping some sūtras in between. Hence is also called Maṇḍūkapluti (leaping of a frog).
- Sometimes words reccur with different vibhakti (form).

Total Sūtras	(3,984) 4,000
Total Words	(7,007) 7,000
Total Words after repeating the words with anuvṛtti	40,000
Compression due to anuvṛtti	(40,000/7,000 $\approx$) 1/6
In terms of byte size, compression	1/3