SYSTEMS OF TERMINOLOGICAL MODERNIZATION OF LUGANDA

EXTRAPOLATION OF LUGANDA EXPRESSION FORMATION RULES

Present-day Luganda does not seem to have an economical mechanism, which would enable a physicist to render prefixes which connote size or quantity such as:

(1) *macromacro-, ultramacro-, mega- ~ macro-, maxi-, hyper-~ super-, sub-~ hypo-, infra-, mini-, micro-,*
ultramicro-, micromicro-

What would be the most economical, productive, transparent and yet linguistically acceptable set of expressions to render the above prefixes into scientific Luganda?

One could set up the following correspondences:

(2)	*-nene nnyo nnyo ddala*	'very very big indeed'
	-nene nnyo nnyo	'very very big'
	-nene nnyo ddala	'very big indeed'
	-nene nnyo	'very big'
	-neneko	'a bit bigger'
	-nene	'big'
	-tono	'small'
	-tonoko	'a bit smaller'
	-tono nnyo	'very small'
	-tono nnyo ddala	'very small indeed'
	-tono nnyo nnyo	'very very small'
	-tono nnyo nnyo ddala	'very very small indeed'

Bearing in mind that scientific expressions tend to deviate from ordinary expressions in that they are often artificial, as the above English examples indeed evidence (ultamicro- is an artificial Greco-Latin hybrid), one would be tempted to fossilise the Luganda expressions indicating the gradation of quantity or size in order to obtain:

(3) *-nnyonnyoddala*
-nnyonnyo
-nnyoddala
-nnyo
-ko

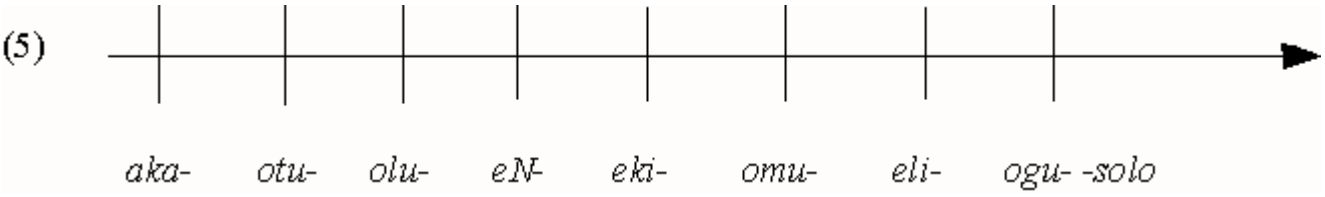
How would one render 'macromolecule' and 'micromolecule' using the above proposal? If *molecule* → *molekyu*, then

(4)	*macromolecule*	*molekyunnenennyoddala*
	micromolecule	*molekyuntononnyoddala*

While *molekyunnenennyoddala* and *molekyuntononnyoddala* would be probably unnecessarily long (i.e. uneconomical), *makromolekyu* and *mikromolekyu* would entail complete opacity to most Luganda-speakers.

In what follows I propose a radical but systematic solution to the problem. The argument which is to lead to the required solution revolves around the simple observation that for almost every semantic feature Luganda nominal prefixes can be arranged on a line such that they form a semantic continuum. For example, let us consider the semantic feature size (three-dimensional space). If we take the nominal stems -solo 'animal', -zigo 'butter', -somero 'school', -ti 'tree', and -ambe, 'knife', we obtain:

(5)



Thus,

(6)

akasolo, 12/14	'animal: diminutive'
**otusolo, 13/*	
olusolo, 11/10	'animal: attenuated'
ensolo, 9/10	'animal'
ekisolo, 7/9	'animal: fairly big'
omusolo, 3/4	'animal: big'
essolo, 5/6	'animal: very big'
ogusolo, 20/22	'animal: extremely big'

In respect of *omusolo* some native speakers' intuition could be at variance with mine: that is, whether *omu-, 3/4* is augmentative when extrinsic. But from *ensimbi, 9/10* 'money' we can obtain *omusimbi, 3/4*, 'huge amount of or far too much money'. Consequently, *omu-, 3/4* is augmentative at least in some extrinsic positions.

(7)

Thus,

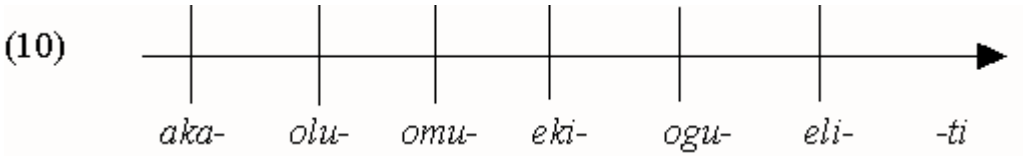
akazigo, 12/14	'butter: little'
otuzigo, 13	'butter: insufficiently little'
oluzigo, 11/10	'butter: spread out'
omuzigo, 3/4	'butter'
ekizigo, 7/8	'butter; massive: fairly big'
ezzigo, 5/6	'massive: big'
oguzigo, 20/22	'butter; massive: very big'

(8)

Thus,

(9) *akasomero, 12/14* 'school: diminutive'
olusomero, 11/10 'school: attenuated'
essomero, 5/6 'school'
ogusomero, 20/22 'school: augmentative'

(10)



Thus,

(11) *akati, 12/14* 'tree: diminutive'
oluti, 11/10 'tree: attenuated'
omuti, 3/4 'tree'
ekiti, 7/8 'tree: fairly big'
etti, 5/6 'tree: big'
oguti, 20/22 'tree: very big'

(12)

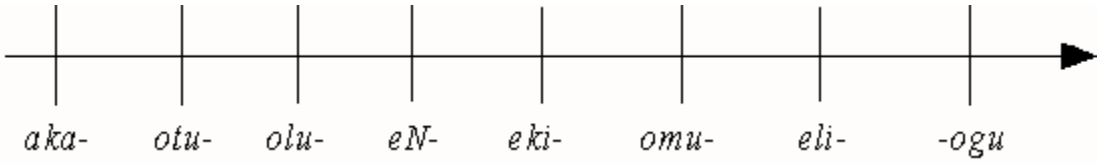
Thus,

(13) *akambe, 12/14* 'knife: diminutive'
olwambe, 11/10 'knife: attenuated'
ekyambe, 7/8 'knife: fairly large'
omwambe, 3/4 'knife: large'
elyambe, 5/6 'knife: very large'
ogwambe, 20/22 'knife: extremely large'

The intrinsic noun is *omwambe, 3/4*

It is observable that whenever the intrinsic prefix of the noun changes, the prefixes have to be rearranged relatively. The gradation, however, remains intact:

(14)



The slot for intrinsic *eN-, 9/10* and *omu, 1/2* is also the slot for any other intrinsic nominal prefix. If it is assumed that quantity varies directly as volume, then the semantic gradation for volume is the same as that for quantity. The scientific English prefixes above are now to be rendered into scientific Luganda by means of Luganda nominal prefixes. I take the following preliminary steps. Firstly, I disregard *otu-, 13/*[illegible] for it is not very productive when extrinsic. Secondly, I discard *eN-, 9/10* and *omu, 1/2* for they are hardly ever extrinsic. Thirdly, I refine the gradation by introducing *wa-, nna-, sse-*, and *ka-* as intensifiers, and also by permitting unusual superimposition of nominal prefixes on others.

As a consequence, I venture to posit

(15)

E	10^{18}	exa-	*kagu-*
P	10^{15}	peta-	*ssegu-*
T	10^{12}	tera-, macromacro-	*nnagu-*
G	10^{9}	giga-, ultramacro-	*wagu-*
M	10^{6}	mega-, macro-	*kali-*
k	10^{3}	kilo-, maxi-	*sseri-*
h	10^{2}	hecto-, hyper-	*nnali-*
da	10^{1}	deca-, super-	*wali-*
	10^{0}		
d	10^{-1}	deci-, sub-	*walu-*
c	10^{-2}	centi-, hypo-, infra-	*nnalu-*
m	10^{-3}	milli-, mini-	*sseru-*
u	10^{-6}	micro-, micro-	*kalu-*
n	10^{-9}	nano-, ultramicro-	*waka-*
p	10^{-12}	pico-, micromicro-	*nnaka-*
f	10^{-15}	femto-	*sseka-*
a	10^{-18}	atto-	*kaka-*

as the comprehensive rendering to Luganda numerical gradational prefixes used with the International System of Units.

The prefixes immediately next to the decimal factors are the SI numerical prefixes as adopted by the International Union for Pure and Applied Physics (IUPAP). Otherwise, if the physicist is merely interested in the general concept of gradation the juxtaposed prefixes are in currency, for example, an ultramicrobalance is an extremely sensitive balance for metrological accuracy of the order 10^{-}11kg. For both general and numerical gradation I propose two sets of prefixes in Luganda
(cf. Table 3).

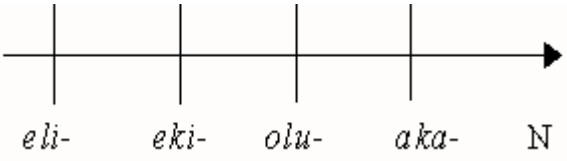
In my proposal I have refined the basic gradation in Fig.2.

Some of the compound prefixes in (15) are attested in Present-day Luganda. Let me consider their attestation beginning with *sseri-*.

(16)
sse+ li+ kadde → *ssekkadde*
'old' 'venerable old man'
sse+li+ wanga → *sseggwanga*
'cock' 'big cock'
sse + l i+ anyi → *sseryanyi*
'strength' 'strong person'
sse+ li+ lume → *sseddume*
'male' 'male animal'
nna + lu+ lungi → *nnalulungi*
'beautiful' 'beautiful girl'
nna+ lu+ biri → *nnalubiri*
attenuated 'body' 'slim person'
nna+ ka+ ato → *nnakaato*
diminutive 'boat' 'canoe-shaped'
nna+ ka+ were → *nnakawere*
'baby' 'mother of baby'
nna+ li+ luvu → *nnadduvu*
'greedy' 'greedy woman'
sse+ lu+ ganda → *sseruganda*
'relationship' 'brother'
sse+ ka+ lootera → *ssekalootera*
'dream for' 'head'
ka+ tonda → *katonda*
'create' 'creator'
wa + ngo → *wango*
'leopard' 'Mr. Leopard'

The rest of the superimpositions are not attested; nevertheless they do not sound very counterintuitive. In Present-day Luganda the gradation for number as such (not quantity associated with number) is the very inverse of the gradation for quantity, that is

(17)



Natural numbers are articulated as follows:

(18)

-mu	1
-biri	2
-satu	3
-na	4

-taano 5
mukaaga, 3 6
musanvu, 3 7
munaana, 3 8
mwenda, 3 9
kkumi, 5/6 10
kkumi na (...+ SN (mu, biri, satu, na, taano))
11 12 13 14 15

kkumi na ((mu) + SN (kaaga, sanvu, naana, enda))
16 17 18 19

amakumi abiri 20
amakumi asatu 30
amakumi ana 40
amakumi ataano 50
nkaaga, 10 60
nsanvu, 10 70
kinaana, 7 80
kyenda, 7 90
kikumi, 7/8 100
bikumi bibiri 200
bikumi bisatu 300
bikumi bina 400
bikumi bitaano 500
lukaaga, 11 600
lusanvu, 11 700
lunaana, 11 800
lwenda, 11 900
lukumi, 11/10 1000
enkumi bbiri 2000
enkumi ssatu 3000
enkumi nnya 4000
enkumi ttaano 5000
kakaaga, 12 6000
kasanvu, 12 7000
kanaana, 12 8000
kenda, 12 9000
kakumi, 12/14 10000
bukumi butaano 50000
bukumi mukaaga 60000
bukumi mwenda 90000
kasiriivu, 12/14 100000
kakadde, 12/14 1000000
kawumbi, 12/14 10000000
kase, 12/14 100000000
katabalika, 12/14 1000000000

Ignoring inconsistencies in the articulation of cardinal number the following fuller gradation for cardinal number emerges:

(19)	10^1	ten	10^1	(e)kkumi
	10^2	one hundred	10^2	(e)kikumi
	10^3	one thousand	10^3	(o)lukumi
	10^6	one million	10^6	(a)kakadde
	10^9	one billion	10^9	wakkadde
	10^{12}	one trillion	10^{12}	wakikadde
	10^{15}	one quadrillion	10^{15}	walukadde
	10^{18}	one quintillion	10^{18}	wakakadde
			10^{21}	nnakkadde
			10^{24}	nnakikadde
			10^{27}	nnalukadde
			10^{30}	nnakakadde
			10^{33}	ssekkadde
			10^{36}	ssekikadde
			10^{39}	sserukadde
			10^{42}	ssekakadde
			10^{45}	(a)kawumbu
			10^{48}	waggumbu
			10^{51}	wakiwumbu
			10^{54}	waluwumbu
			10^{57}	wakawumbu
			10^{60}	nnaggumbu
			10^{63}	nnakiwumbu
			10^{66}	nnakawumbu
			10^{69}	sseggumbu
			10^{72}	ssekiwumbu
			10^{75}	sseruwumbu
			10^{78}	ssekawumbu
			10^{81}	(a)katiiriitu
			10^{84}	wattiiriitu
			10^{87}	wakitiiriitu
			10^{90}	walutiiriitu
			10^{93}	wakatiiriitu
			10^{96}	nnattiiriitu
			10^{99}	nnakitiiriitu
			10^{102}	nnalutiiriitu
			10^{105}	nnakatiiriitu
			10^{108}	ssettiiriitu
			10^{111}	ssekitiiriitu
			10^{114}	sserutiiriitu
			10^{117}	ssekatiiriitu

sse- intensifies more than *nna-* which, in turn, intensifies more than *wa-* (cf. Fig. 2). The nominal stems *-kadde, -wumbu, -tiiritu* belong to the nouns *akakadde*, 12 'million',

empumbu, 9 'sawdust' and *akatiiririitu*, 12 'something very small'; *akatiiriitu* would be smaller than *akawumbu* which, in turn would be smaller than *akakadde* (a diminutive form of *omukadde* 'old person').

In scientific Luganda articulation of extremely large and infinitesimal numbers would be occasioned by statements like:

(a) The earth contains about 10^{51} atoms.
(b) The sun is composed of about 10^{57} atoms.
(c) The solar system contains about 10^{70} atoms.
(d) The universe contains about 10^{80} atoms.
(e) The age of the universe is about $4x10^{17}$ years.

Applying the daringly extrapolative move in (19), I render the numbers into Luganda as follows:

(a) atomu wakiwumbu
(b) atomu wakawumbu
(c) atomu nnakawumbu kkumi
(d) atomu sseruwumbu kikumi
(e) emyaka walukadde ebikumi bina

Even somewhat queer combinations of SI (sub) multiples with extremely large numbers are conceivable. For example 10^{20} Tm can be read in the extrapolated Luganda as: *nnagumita wakakadde kikumi*

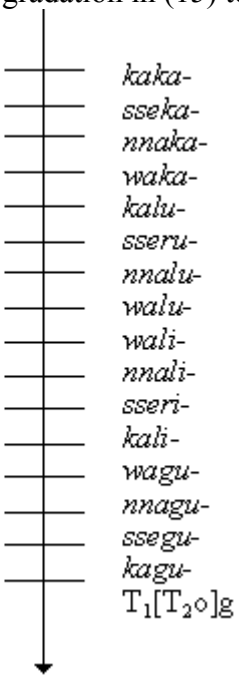
For the gradation of length of time, I consider the geological hierarchy in (20).

(20)

Era of...	Obukulu	(o)bwa...
Period of...	Omugigi	(o)gwa...
Epoch of...	Ekiseera	(e)kya...

Then I invert the gradation in (15) to obtain (21) (i.e. going back on the time line).

(21)



The gradation in (21) will later be used to render the Geological Time Scale.

I now conclude the task of extrapolating Luganda expression formation with a substantial injection of expression formation morphemes into scientific Luganda. The main patterns of expression formation I shall use are:

(a) SA (*nna.* N)
(b) SA ((*li.* (SV. DA(*a*))). N)
(c) SA (X. (SV DA (a))), where X is *nnali,*
nnamu, or *nnaka*

exemplified by	*-nnakampala*	'Kampalan'
	-nnamateeka	'legal'
	-ddekabusa	'devastating'
	-zzisabyalo	'devastating'
	-ttabamiruka	'ecumenical, general'
	-nnamuzisa	'destructive'
	-nnamutta	'deadly'
	-nnabbambula	'scorching'
	-nnakayogeza	'verbal'

Their explicit mode of formation is as follows:

(a) `SA (*nna.* N(*kampala*))
SA (*nna.* N(*mateeka*))
'laws'

(b) `SA ((*li.* (SV(*lek*). DA (a))). N(*busa*))
'to leave' 'nakedness'

`SA ((*li.* (SV(*(zis)*. DA (a))). N(*byalo*))
'to destroy' 'villages'
`SA ((*li.* (SV(*(tab)*. DA (a))). N(*miruka*))
'to join' 'parishes'

(c) `SA ((*nnamu*. (SV (*zis*). DA (a)))
'to destroy'
`SA ((*nnamu.* (SV(*tt*). DA (a)))
'to kill'
`SA ((*nnali.* (SV(*bambul*). DA (a)))
'to scorch'
`SA ((*nnaka.* (SV(*yogez*). DA (a)))
'to cause to speak'

Phrases like *omunnamateeka* 'lawyer'
musisi ddekabusa 'devastating earthquake'
entalo zizzisabyalo 'devastating wars'
olukiiko luttabamiruka 'ecumenical council'
ebyokulwanyisa binnamuzisa 'weapons of mass destruction'
obulwadde bunnamutta 'deadly disease'
omusana gunnabbambula 'burning sunlight'
ekigambo kinnakayogeza 'verbal word'
are acceptable in Present-day Luganda.

SA (*nna*. N) is a denominal adjective, while SA(X. (SV. DA (a))) is deverbal. I wish to stipulate that if SA (X. (SV. DA (a))) is also possible and acceptable, then SA ((*li*. (SV. DA (a))).N) is also possible and acceptable provided that the choice of N is conceptually feasible. In SA (X. (SV. DA (a))), the order of preference is to be: *nnali, nnamu,* and *nnaka* for X; that is, *nnamu* is taken if *nnali* would be counterintuitive, and *nnaka* is adopted if *nnamu* would also be counterintuitive. Essentially, with the Table 3, I endeavour to generate a myriad of denominal adjectives which are economical systemic and consistent.