Electromagnetic Sequence and Vector Behavior of the Prime Number Growth Double-Helix

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***Abstract*—This paper reveals electromagnetic and physical vector properties discovered through the extended pattern analysis of the 5-step double-threaded helix prime number growth structure found to dominate the first 500 prime numbers. The electromagnetic sequence reversal patterns between the threads and their bonds are either end-to-end or 90-degrees. The bijective transforms and curl vectors guide us to a potential electromagnetic model of prime number growth behavior. This model is submitted as an initial method and model to place into electromagnetic and harmonic computational modeling tools by professionals in scientific computing fields.**

***Index Terms*—Double-helix, electromagnetic, growth, prime numbers.**

I. Introduction

Recently an effort found the sequential growth pattern of the first 500 prime numbers to be related to three key characteristics: the “2” and “4” threads, the multiples of “6” as bonding elements between the threads, and the periodic increment of the threads by the bonding multiples of “6”. The structure of the sequence somewhat resembles an elliptically flattened coil, with the “2” and “4” thread elements at the extreme end of the coil. The influenced increments of “6” on the elements in the 2-4 threads were primarily occurring at a rate of 5 coil cycles. Overlapping the most likely cause and effect pairs gave two possible double-helix models: a cross-torque model and an outside torque model, with one of the threads staying closest to the center. The selection of the model was left to the computational needs of the scientist [1]. The “2” thread rotating at a rate of 5 elements (cycles) per 360 degrees forms a cylinder, similar to a virus shell. The same property exists for the “4” thread.

This paper is the next level of pattern analysis. Key patterns in this double-threaded structure lead us to consider the growth behavior of the prime numbers as having a direct connection to electromagnetic or other physical sciences.

The following types of “6” influenced patterns exist: tail-to-tail sequence reversals, repeated palindromes at a 5-step coil cycle gap (360-degrees later), repeated thread or bond sequences, and patterns rotated 90-degrees at a 5-step pivot point that places the “6” influence pattern over the other thread(s) and bond(s). A closer examination of three key reversal patterns reveals the existence of perpendicular curl vectors.

What does this mean? It means that with a 5-step model we have very strong indication of an electromagnetic sequence relationship between the threads. To show the certainty of these patterns, this paper starts with the most densely populated section of the 500 prime number increment series (coils 28 to 49). Next, coils 134 to 154 are examined before the initial coils (1 to 28) are examined for how the discovered patterns may apply to the original growth characteristics.

We then evaluate the horizontal and vertical vectors of the 5-step “2” and “4” shells and find an interwoven structure of reversal patterns.

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II. Patterns in the Most Densely Populated Section

It may be counterintuitive to unravel the most densely populated section first, but it is that very robustness of this section that yields such a rich return of populated patterns. Table 1 makes these patterns discernable by using both shaded boxes and alphanumeric notation to visibly associate the series.

Table 1. Patterns in the most densely populated coils

#		2	2 to 4 Bond					4	4 to 2 Bond				
28	A1	2				A6		10			A6		
29	A2	2				6		4	B1		6		
30	A3	8						4	B2				
31	A4	2						4	B3			12	C1
32	A5	8						4	B4				C2
33	A6	8						4	B5	6		12	C3
34	B5	2		18		6		10	A6	6		6	C4
35	B4	2			6	C5		10	A5	6		6	C5
36	B3	2		6	6	C4		4	A4				
37	B2	2	F1		12	C3		10	A3	D1	D2		
38	B1	2	F2			C2		4	A2	6	6		
39		2	F3		12	C1		4	A1		6		
40		8	F4					10	E1	F5			
41		8	F5					10	E2	F4			
42		8		D2	6	6		4	E3	F3			
43		8		D1	6			4	E4	F2			
44		8						4	E5	F1			
45	E6	14						10	E6		12	C1	
46	E5	2						10	E7				
47	E4	2						4					
48	E3	2					D2	10					
49	E2	14						4					

What do we see that immediately takes our breath away? Sequence C1 to C5 is exactly reversed within coils 31 to 39, resembling a transposed bijective relationship. This sequence depicts the importance of both nonzero elements and zero elements (or spaces) of a sequence. We will look at using these sparse matrix properties late in the paper. As we compare the rest of the sets of patterns in this coil section, we see sequences transformed to another thread or to a thread

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bond. The rate of the sequence flipping is related to some form of 5-step association between the coils. Sequence A1 to A5 series is the next dominant pattern that persuades us this is not a coincidence. It is a very clear example of a series connected tail-to-tail as it is transposed to another thread.

It also uses a different reversal pivot coil than the C1 to C5 sequence. Different reversal points are indications of a sequence reversal behavior that reinforces our continual 5-step coil model.

Other sequences bring slightly different features. Sequence B1 to B5 is non-incremental, or zero with regards to "6" increments. Sequence F flips on a 4-2 bond coil section, from coil 40 wrapping around to the right to coil 41. Items D1 and D2 possibly indicate a 90-degree rotation. Other rotations also become evident. When we look in coil 35, the three "6" increments in the "10-6-6" string across the 4-thread and the 4-2 bond can be rotated 90-degrees to the 8-8-8 series in coils 40 to 42 of the 2-thread. Sequence E has a reversal that seems to add its extra end values into the single end elements of its reversal in coils 45 to 49 in the 2-thread. It appears as if E1 combines with E2, and as if E6 combines with E7.

III. Further Electromagnetic Patterns

We will now cover some shorter overlapping and rotating sequences in 5-step transpositions before we return to assess the nature of the starting sequence. Our last section of coils to review prior to assessing the beginning sequence is coils 134 to 154. The purpose of including this section is to show shorter sequences of four that add a gap not normally included in the sequence. When this gap is included the sequence can easily be transposed at our standard periodicity of five coil steps.

Table 2. The rotating sequences with steps of 5

#		2	2 to 4 Bond					4	4 to 2 Bond			
134		2					S1	16				
135	N1	14					S2	4			6	
136	N2	8			6		S3	4			18	P1
137	N3	8					S4	10		6	6	P2
138	N4	8						10			12	P3
139	N5	14	S1					4		6	6	P4
140		2	S2				Q3	28				P5
141	P5	2	S3				N5	10				
142	P4	8	S4				N4	4				
143	P3	14		P3	P4		N3	4				
144	P2	8	P2	12	6	12	N2	4			6	
145	P1	20	Q1			S1	N1	10				
146		2	Q2					16				
147		26	Q3					4				
148		2	Q4	12	6			4		12	6	
149		8		R1	R2			4				
150		8					Q1	22				
151		2					Q2	4				
152	R1	2	12				Q3	28				
153	R2	2	6		6	6	Q4	4		R2	6	
154		2			12			4		R1	12	

Our key sequences that have this open fifth element gap are P1 to P5, S1 to S4, and Q1 to Q4. Sequence P is transposed or transformed, both vertically and partially horizontally. Vertically it is reversed from the 4-2 bond (coils 136 to 140) to the 2-thread (coils 141 to 145). The darkened empty cell P5 is not used in the 2-thread, but including it gets us a clean tail-to-tail sequence reversal. The horizontal transformation of sequence P1 to P5 focuses on its elements P2, P3, and P4 in coil 144, where the "6-12-6" pattern is rotated 5-steps after its completion in coil 139.

Our other two sequences of concern ("S" and "Q") are not reversals, but rather are tail-to-head transposed copies of their sequences to the opposite thread. The incremental sequences are "12-0-0-6" and "18-0-24-0" for "S" and "Q" respectively.

We also see an amazing pattern. Not only do these new 5-step sequences link tail-to-head, but they form a "V" pattern converging and diverging on coil 144. Coil 144 was also a focal coil in the double transposition of the P-sequence. Viewing the model as being based on a 5-coil step per 360 degrees is beginning to return a robust and solid model for future analysis.

The remaining sequences of "N" and "R" should be quickly addressed also. Sequence N is a reversal pattern that differs between the 2-thread and the 4-thread by a scalar multiple "6". The related "6" multiple sequences are "12-6-6-6-12" and "6-0-0-0-6". This is a clear linear transformation added to each thread's base values [3]. Sequence R is an example of a frequently occurring short sequence that gets rotated or transposed, whose zero values might get lost in tracking due to other overlapping or element sharing.

IV. Assessing the original behavior and intial events

We can now review the sequences in coils 1 to 28 and try to assess some core behaviors that start with these patterns. In Table 3 we will assume that the duplicative symmetric sequences ("4-10-4-10-4", for example) are actually reversals of the same symmetric sequence.

Our first obvious pattern is at coil 16, where there seems to be another place of major convergence. We see not just the reversal of sequence V1 to V5, but also the reversal of sequence W1 to W5 and the 90-degree transform-transpose of the two V1 elements onto the 2-4 bond of coil 16. In these first 28 coils we have some clear patterns that would initially lead us to think the major pattern is a policy of "mirroring your own thread sequences." Even the 4-2 bonding of coils 4 to 8 in sequence X is exactly reversed in coils 10 to 14. These mirroring characteristics will return when we review the curl vector properties in the next section.

If we consider the 5-step relationship and the impact of an individual item (multiple of 6), we get the T1 transposed relationship in coils 3 and 8 of Table 4. It might not be a coincidence that the first occurrence of "6" happens in the exact middle of the first 5-step 2-4 coil sequence. The resulting increase to the 2-thread in coil 8 is also in the middle of the second 5-step 2-4 coil sequence. Ten steps later, this "6" seems to also appear in coil 13 back in the 4-2 bond. This happens almost as if the amplitude (or mass) is combined at the center turn-in point of cardioids or limascons.

What else is happening on a micro-scale? The 90-degree bonds of shorter sequences become present. We look at the 2-4 bonds of coils 6 and 7 and now wonder if they are possibly related to the W4 "6-6" pair in the 4-2 bond of coil 5. On a larger scale, it appears that 90-degree bonds may control the behavior of the entire structure. Since elements from different threads separated by 5-coil step are at different

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spiral levels, we would need a perfect overlay of the 2 and 4 thread elements for the bonding between reversal sequences *not* to be 90-dgrees.

Table 3. The mirroring of patterns on the same threads

#		2	2 to 4 Bond					4	4 to 2 Bond				
1	U1	2						4					
2	U2	2						4					
3	U3	2						4	T1	6			
4	U4	2			6			4					X1
5	U5	2						4		6	6	W4	X2
6		2			6		U5	4					X3
7		2			6		U4	4			6	W2	X4
8		8	T1		W4		U3	4					X5
9		2					U2	4					
10		2					U1	4					X5
11	V1	14						4	W1		6		X4
12	V2	2						10	W2	T1			X3
13	V3	2		6	6			4	W3	6	6		X2
14	V4	2		Z1	Z2			10	W4				X1
15	V5	2						4	W5				
16		2		12	12			4					
17	V5	2		V1	V1			4	W5			6	Aa1
18	V4	2						10	W4	6	6	6	Aa2
19	V3	2			6			4	W3	Z1	Z2		
20	V2	2	Bb1		W4			10	W2				
21	V1	14	Bb2	C1				4	W1				
22		2	Bb3	C2				4					
23		14	Bb4	C3	6	Aa1	Aa2	10					
24	Cc1	2	Bb5					4		6			
25	Cc2	8		6		6		4			6		
26	Cc3	8				W2		4			W2		
27	Cc4	8						10					
28	Cc5	2						10					

If these 2-4 elements are balanced by mass or other physical torque-related property, it is more likely that the 2-4 threads do not directly overlap. This means that with either a cross-torque model or an outside spiraling coil model, we have a strong indication of the existence of 90-degree bonds between the reversal sequences and throughout the growth structure.

V. Analyzing the 3-D Curl Vectors

We have to wonder about the existence of curl vectors for the possible electromagnetic behavior [4]. We also have to wonder if the presence of curl vectors combined with the incompressibility of prime numbers may help represent the incompressible or expanding nature of fluids.

If we assume that the model's structure is based on 5-steps (which seems very likely), we would reason that a vertical curl vector would be found in the stacking of every fifth element in either the threads or the bonds. The result of much comparison is just that for some of our key sequences.

Table 4 displays the result for three sequences ("C", "A", and "V") we have already discussed in this paper to show they exhibit this behavior. We start with the sequence that was our first indicator of possible electromagnetic properties, sequence C. When we start with a pattern on the thread bonds that has multiple values, finding a closely corresponding sequence on a constrained (2 or 4) thread can provide guidance on which thread bond value to select. Such is the case with sequence "C" and the value to select at coil 35. This is a reversal sequence on opposite bonds (4-2 and 2-4). Strangely enough, the sequence is pushed onto the 2-thread (center of the 4-2 and 2-4 bond) as if being placed on a stack by a push-down automata [5], [6]. The sequence is then popped off in order as the spiral of the 4-2 bond approaches the curl vector in coil 36. The 2-4 bond then pops the sequence in reverse order.

Both of these sequence C bonds occur after the curl vector is generated, as if absorbing the vector. Sequence A's curl vector appears much cleaner, maybe due to the lack of overlap on a common coil as with sequence C. Sequence A also could be classified as absorbing or popping a preexisting vector or sequence. The same behavior does not seem to occur for either reversals on a common thread/bond or reversals on adjacent threads-bonds.

Table 4. The 3-D vectors of the reversal sequences

#	Seq.	Value	6-value	Vector, Coils, and Values						
30	--	0	0							
31	C1	12	12							
32	C2	0	0							
33	C3	12	12	Vector on 2 Thread						
34	C4	6	6	36	31	26	21	16	11	6
35	C5	6/0	6 or 0	2	2	8	14	0	14	0
--	--	--	--	0	0	6	12	0	12	0
35	C5	6/0	6 or 0	Select 0 value at coil 35 overlap						
36	C4	6	6							
37	C3	12	12							
38	C2	0	0							
39	C1	12	12							
40	--	0	0							
28	A1	2	0							
29	A2	2	0							
30	A3	8	6							
31	A4	2	0							
32	A5	8	6	Vector on 2 to 4 Bond						
33	A6	8	6	34	29	24	19	14	9	
--	--	--	--	6	6	0	6	0	0	
34	A6	10	6							
35	A5	10	6							
36	A4	4	0							
37	A3	10	6							
38	A2	4	0							
39	A1	4	0							
10	--	2	0	0	12	0	0	0		
11	V1	14	12	11	16	21	26	31		
12	V2	2	0	Vector on 2 to 4 Bond						
13	V3	2	0							
14	V4	2	0							
15	V5	2	0							
16	--	2	0	0	0	0	12	0		
17	V5	2	0	16	21	26	31	36		
18	V4	2	0	Vector on 4 to 2 Bond						
19	V3	2	0							
20	V2	2	0							
21	V1	14	12							
22	--	2	0							

In sequence V we see two curl vectors, associated with the reversal of V1 to V5 on its own thread. But wait, these vectors are going down! They are increasing in step value as they complete the sequence. Do the reversals on common threads generate instead of absorb? Our sequences X and W in table 3 might help confirm that behavior. Sequence X1 to X5 is on the 4-2 bond with a string of "0-6-0-6-0". A center space of zero value separates in coil 9. That zero space may help explain the curl vector present on the 2-4 bond (with elements spaced 5-steps) at coils 9, 14, 19, 24, and 29 that have the respective values of “0-0-6-0-6”. This also feeds the vector in sequence A.

Sequence W is also generates a vector. Sequence W is on the 4-thread (coils 11 to 16) with a string of “4-10-4-10-4-4”, which holds a “6” related value of “0-6-0-6-0-0”. A possible curl vector is reversed on the 4-thread at 5-steps with coils 17, 22, 27, 32, 37, and 42 with corresponding values of “4-4-10-4-10-4”. Our general observation might be that reversals on the same threads generate vectors and that reversals on opposing threads absorb vectors. The model’s property of possibly generating and absorbing vectors may also correlate to Poynting vectors [7]. These properties of the double- threaded helix could be closely related to the physical characteristics of a fluid dipole flow [8], which would also open the door the understanding the Navier-Stokes problem. While we have not investigated every case, it does appear that we have some curl vector properties in this double-helix structure that reinforce the presence of an electromagnetic of physical property behavior.

VI. THE INTERWOVEN STRUCTURE OF HORIZONTAL AND VERTICAL VECTORS OF THE 5-STEP 2 AND 4 SHELLS

One aspect we would expect to see if the 5-step model makes sense is reversals in the vertical vectors of the elements as they get stacked a 5-step rate. Is that what we see? Yes. We have cylinders that possess vectors reversed vertically and vectors reversed at 90-degrees, not including the earlier discussed horizontal reversals (in-order reversals, such as sequence A, B, V, and W).

If we included all horizontal reversals in table 5, coding and distinguishing the patterns would be impossible. Even the vertical thread patterns of table 1, table 2, and table 3 rotated horizontally would produce overwhelming patterns in rows of table 5 containing the coils of 1 to 49 and 134 to 154. The starting coil numbers of the rows containing these previous patterns are shaded grey with black background to display the need for a better display method and better modeling tool.

In the 5-step coil model, the clockwise rotation of each “2” and “4” thread coil endpoint builds cylinders, or something possibly equivalent to virus shells. It is the multiple overlapping and interwoven reversal patterns that also convince us of natural or electromagnetic properties. We will call the columns of Table 5 “rods” just to help remind us of their predominant physical characteristic in the 5-step model.

We start with an overwhelming amount of vertically reversed patterns. Table 5 displays dark shaded vertical sections with white text, which are clearly reversal patterns. The medium grey shaded cells with black text are also reversal patterns, that when they are adjacent to a dark grey vertical pattern are also partially overlapping with some darker shaded cells.

An interesting twist is what seems to be an insertion of the “12-0-6-0” pattern into the reversal in the fifth rod of the 2-thread cylinder shell, between the two reversed “6-6-0-6” patterns. Two other “12-0-6-0” at coils 86 and 23 are left lightly shaded non-bold text to show overlapping as well as insertion of the pattern.

Table 5. The patterns in cylinder shell rods

Cylinder Shells											
Coil	2 – Thread Rods						4 – Thread Rods				
1	0	0	0	0	0		0	0	0	0	0
6	0	0	6	0	0		0	0	0	0	0
11	12	0	0	0	0		0	6	0	6	0
16	0	0	0	0	0		0	0	6	0	6
21	12	0	12	0	6		0	0	6	0	0
26	6	6	0	0	6		0	6	6	0	0
31	0	6	6	0	0		0	0	0	6	6
36	0	0	0	0	6		0	6	0	0	6
41	6	6	6	6	12		6	0	0	0	6
46	0	0	0	12	0		6	0	6	0	0
51	12	0	18	6	6		0	0	0	6	0
56	12	6	0	0	0		0	0	6	6	6
61	0	0	6	0	6		0	0	18	6	6
66	6	0	0	0	0		0	6	0	0	0
71	0	6	12	0	6		30	6	0	0	0
76	0	0	0	6	6		6	0	0	0	0
81	6	12	0	0	18		0	0	0	6	0
86	0	0	0	6	0		0	6	6	0	6
91	6	12	0	0	0		12	0	0	6	12
96	0	6	0	6	0		18	0	0	6	6
101	12	0	0	0	0		6	0	6	12	0
106	0	6	6	0	6		6	0	12	0	12
111	0	6	0	0	12		0	0	18	0	0
116	0	12	6	24	6		0	0	0	6	0
121	0	0	6	12	0		18	12	0	6	0
126	6	0	6	0	0		0	0	0	6	6
131	6	12	0	0	12		0	6	0	12	0
136	6	6	6	12	0		0	6	6	0	24
141	0	6	12	6	18		6	0	0	0	6
146	0	24	0	6	6		12	0	0	0	18
151	0	0	0	0	0		0	24	0	0	6
156	0	0	18	6	0		12	12	12	0	0
161	0	6	0	0	0		18	6	0	6	--

The “6-6-0-6” pattern appears to bond itself to two “18-0-0-0-0-6” patterns, one in 2-thread rod 5 and one at the 63rd coil of the 4-thread. Both “18-0-0-0-0-6” patterns have a 90-degree “0-0” attachment off the “18”. This “18” focused sequence is a good example of 90-degree relationships as well as repeated insertion sequences, as done in the “12-0-6-0” and “12-0-0-0” pattern in the 2-thread.

We can also see the blatant 90-degree patterns of “0-18-6-0” in the 2-thread, along with the “24-0-0-6”, “0-0-18-0-0”, “30-6-0-0”, and “0-6-12-18-0-0” patterns in the 4-thread.

Sequences and connected patterns repeated in each thread cylinder probably have some binding significance. The darkened vertical “18-0-0-0-0-6” pattern is a solid example. The non-graphically shaded “0-6-12-6-0” pattern on the fifth rod of both the 2-thread and the 4-thread shows a repeated reversal pattern; this pattern ends its 4-thread string at coil 105, where the 2-thread repeats it. A sequence of “6-6-12-0” not only is reversed on the 2-thread at coil 122 but also exists in the repeated vertical “6-6-12-0-0” sequence from coils 94 to 144 on the 4-thread. The two “24-0-6-6-0” sequences at coil 147 on the 2-thread and at coil 135 on the 4-thread may have a third vector on the 2-4 or 4-2 bond farther down. The “24-6-0-0” pattern from coils 117 to 122 also occurs every fifth step in the 2-4 bond at coils 107, 112, 117, and 122 – which gives a clean 90-degree connection at coil 122.

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VII. The Possible Significance

Where can we go from here? What does this model and its patterns force us to consider? The first thing that comes to mind is the certainty of us having something worth further development. We have something statistically significant when we consider the probability that all these unique patterns from large gaps are occurring within a definite structure based on a perfectly alternating 2-4 sequence influenced by the multiples of 6.

The next thing to consider what type of function is producing these relationships. When we think of physical properties and functions with the relationships between the rates of growth, we might lean to second derivative relationships of x^2, $2y^2$, and z^3. This concept is suggested only because of the resulting values from the relationships between second partial derivative values of 2, 4, and 6z, where the z-function is being applied over the 2-4 structure in a 3-D manner.

Finally, it makes us consider the importance of sparse matrices. This will be the most challenging modeling piece. For this paper, since sparse matrices would be the recommended approach to the 2-4 and 4-2 bonds, zeros have been inserted only to balance the two sparse matrices and align them to the maximum number of non-zero items (5) between the two threads. This was not meant to declare specific locations for all zero elements. Table 6 has the gaps between the first 500 prime number starting at 5, and is included at the end just for the readers' optional validation of these and other patterns.

One question remains open. How can this help your efforts?

VIII. Conclusion

This paper hopefully reinforces the existence of electromagnetic or physical vector properties of the prime number growth patterns that can be correlated to several scientific and engineering fields.

The patterns and behavior that we observed were sequence reversals on the same thread, another thread, or bond. Pattern reversal also appeared to be associated with 90-degree vectors. Examples were given of possible curl vector behavior that might be due to vectors either being generated or absorbed.

The 5-step model produces two cylinders with 90-degree and reversal patterns that provide convincing evidence of a significant systemic function similar to an electromagnetic property.

Hand-picking and visual selection is extremely error-prone and is probably only good for this initial analysis to show the existence of E-M vectors and patterns. The 5-coil step double helix prime number growth model needs to be placed into an electromagnetic or scientific modeling tool for further analysis.

Table 6. The gaps of the first 500 primes, excluding primes under 5

Coil	2	2 to 4 Bond					4	4 to 2 Bond				
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	6	0	0	0	0
4	0	0	0	6	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	6	6	0	0
6	0	0	0	6	0	0	0	0	0	0	0	0
7	0	0	0	0	6	0	0	0	0	6	0	0
8	6	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	12	0	0	0	0	0	0	0	0	6	0	0
12	0	0	0	0	0	0	6	0	0	0	0	0
13	0	0	0	0	6	6	0	0	6	6	0	0
14	0	0	0	0	0	0	6	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	12	12	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	6	0	0
18	0	0	0	0	0	0	6	0	6	6	6	0
19	0	0	0	6	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	6	0	0	0	0	0
21	12	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	12	0	0	6	0	0	6	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	6	0	0
25	6	0	6	6	0	0	0	0	0	6	0	0
26	6	0	0	0	0	0	0	0	0	0	0	0
27	6	0	0	0	0	0	6	0	0	0	0	0
28	0	0	0	0	0	0	6	0	0	0	0	0
29	0	0	0	6	0	0	0	0	0	6	0	0
30	6	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	12	0	0
32	6	0	0	0	0	0	0	0	0	0	0	0
33	6	0	0	0	0	0	0	0	6	12	0	0
34	0	0	0	18	6	0	6	0	6	6	0	0
35	0	0	0	6	0	0	6	0	6	6	0	0
36	0	0	6	6	0	0	0	0	0	0	0	0
37	0	0	0	12	0	0	6	0	0	0	0	0
38	0	0	0	0	0	0	0	0	6	6	0	0
39	0	0	0	12	0	0	0	0	0	6	0	0
40	6	0	0	0	0	0	6	0	0	0	0	0
41	6	0	0	0	0	0	6	0	0	0	0	0
42	6	0	6	6	0	0	0	0	0	0	0	0
43	6	0	0	6	0	0	0	0	0	0	0	0
44	6	0	0	0	0	0	0	0	0	0	0	0
45	12	0	0	0	0	0	6	0	0	12	0	0
46	0	0	0	0	0	0	6	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	6	0	0	0	0	0
49	12	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
51	12	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0
53	18	0	0	0	0	0	0	0	0	0	0	0
54	6	0	0	0	0	0	6	0	0	0	0	0
55	6	0	0	0	0	0	0	0	6	6	0	0
56	12	0	0	0	0	0	0	0	6	6	0	0
57	6	0	6	12	0	0	0	0	0	6	0	0
58	0	0	0	0	0	0	6	0	0	0	0	0
59	0	0	0	6	0	0	6	0	0	0	0	0
60	0	0	0	0	0	0	6	0	0	0	0	0
61	0	0	6	18	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	6	6	0	0
63	6	0	6	6	0	0	18	0	0	0	0	0
64	0	0	0	0	0	0	6	0	0	0	0	0
65	6	0	0	0	0	0	6	0	6	6	0	0
66	6	0	0	12	0	0	0	0	6	6	0	0
67	0	0	6	12	0	0	6	0	0	18	0	0
68	0	0	0	0	0	0	0	0	0	6	0	0
69	0	0	0	6	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	12	0	0
71	0	0	0	6	0	0	30	0	6	6	0	0
72	6	0	0	18	0	0	6	0	0	0	0	0
73	12	0	0	0	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	0	0	6	0	0
75	6	0	0	0	0	0	0	0	0	0	0	0
76	0	0	6	12	0	0	6	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	6	12	12	0

Coil	2	2 to 4 Bond					4	4 to 2 Bond				
79	6	0	12	6	0	0	0	0	0	6	0	0
80	6	0	0	0	0	0	0	0	0	0	0	0
81	6	0	0	0	0	0	0	0	0	0	0	0
82	12	0	0	0	0	0	0	0	0	6	0	0
83	0	0	0	0	0	0	0	0	0	6	0	0
84	0	0	0	6	0	0	6	0	0	0	0	0
85	18	0	0	6	0	0	0	0	0	0	0	0
86	0	0	0	24	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	6	0	12	0	0	0
88	0	0	0	0	0	0	6	0	0	0	0	0
89	6	6	6	6	18	6	0	0	0	0	0	0
90	0	0	0	12	0	0	6	0	12	0	0	0
91	6	0	0	0	0	0	12	0	0	0	0	0
92	12	0	0	6	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	6	12	6	6	18	0
95	0	0	0	0	0	0	12	0	0	0	0	0
96	0	0	0	0	0	0	18	0	0	6	0	0
97	6	0	0	6	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0
99	6	0	0	6	0	0	6	0	0	0	0	0
100	0	0	0	0	0	0	6	0	0	0	0	0
101	12	0	0	0	0	0	6	0	6	12	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	6	0	0	12	0	0
104	0	0	0	0	0	0	12	0	0	0	0	0
105	0	0	0	6	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	6	0	0	0	0	0
107	6	0	18	24	0	0	0	0	0	6	0	0
108	6	0	0	0	0	0	12	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0	0
110	6	0	0	0	0	0	12	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0	0	0
112	6	0	6	6	0	0	0	0	0	12	0	0
113	0	0	0	0	0	0	18	0	0	6	0	0
114	0	0	0	6	0	0	0	0	0	6	0	0
115	12	0	0	6	0	0	0	0	0	0	0	0
116	0	0	0	6	0	0	0	6	12	6	6	0
117	12	0	0	0	0	0	0	6	12	0	0	0
118	6	0	0	6	0	0	0	0	0	0	0	0
119	24	0	0	18	0	0	6	0	0	0	0	0
120	6	0	0	0	0	0	0	0	0	6	0	0
121	0	0	0	6	0	0	18	0	0	12	0	0
122	0	0	0	0	0	0	12	0	0	0	0	0
123	6	0	0	0	0	0	0	0	0	12	0	0
124	12	0	0	0	0	0	6	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0
126	6	0	6	6	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	6	0	0
128	6	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	6	0	0	6	0	0	0	0	0
130	0	0	0	0	0	0	6	0	0	0	0	0
131	6	0	0	0	0	0	0	0	0	0	0	0
132	12	0	0	0	0	0	6	0	0	12	0	0
133	0	0	0	6	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	12	0	0	0	0	0
135	12	0	0	0	0	0	0	0	0	6	0	0
136	6	0	0	6	0	0	0	0	0	18	0	0
137	6	0	0	0	0	0	6	0	6	6	0	0
138	6	0	0	0	0	0	6	0	0	12	0	0
139	12	0	0	0	0	0	0	0	6	6	0	0
140	0	0	0	0	0	0	24	0	0	0	0	0
141	0	0	0	0	0	0	6	0	0	0	0	0
142	6	0	0	0	0	0	0	0	0	0	0	0
143	12	0	0	0	0	0	0	0	0	0	0	0
144	6	0	12	6	12	0	0	0	0	6	0	0
145	18	0	0	0	0	0	6	0	0	0	0	0
146	0	0	0	0	0	0	12	0	0	0	0	0
147	24	0	0	0	0	0	0	0	0	0	0	0
148	0	0	12	6	0	0	0	0	12	6	0	0
149	6	0	0	0	0	0	0	0	0	0	0	0
150	6	0	0	0	0	0	18	0	0	0	0	0
151	0	0	0	0	0	0	0	0	0	0	0	0
152	0	0	0	12	0	0	24	0	0	0	0	0
153	0	0	6	6	6	0	0	0	0	6	0	0
154	0	0	0	12	0	0	0	0	0	12	0	0
155	0	0	0	0	0	0	6	0	0	0	0	0
156	0	0	0	0	0	0	12	0	0	0	0	0
157	0	0	0	0	0	0	12	0	0	6	0	0
158	18	0	0	0	0	0	12	0	0	0	0	0
159	6	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	18	0	0	0	0	0
162	6	0	12	6	0	0	6	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	6	0	0
164	0	0	0	6	0	0	6	0	0	0	0	0
165	0	0	0	12	0	0	--	0	0	0	0	0

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