June 18, 2012

Unified Theory of Electrical Machines and A philosophical explanation to how a Universe can be created just from nothing

Mourici Shachter
Holon, Israel
mourici@walla.co.il

Introduction

It is well known that physics explains natural phenomena using mathematics, But what happens if we derive from a good physical experiment a wrong mathematical equation, use it for more than 100 years without knowing it is wrong. In this paper I develop again the equation of energy conversion in a general electrical machine and prove that the equations we use are wrong. One of Professor Einstein statements was that the laws of physics are the same for every observer so I made the electrical equation of the machine to look like the mechanical equation. What I found was astonishing and is valid for all other area in physics. It is found that in general any constant in physic can be represented by a superposition of time and phase dependent sinusoidal function. So may be what we think about speed of light and other physical constant is entirely wrong. In the last part of this issue, I use the consequences of that article to create a virtual universe.

Chapter 1

Single-phase sinusoidal electric circuit

In the figure below, the AC single-phase voltage source is connected to an electrical load Z_L. Due to impedance linearity the current is sinusoidal but may lag or lead impedance voltage with some angle φ;

1. $v(t) = \sqrt{2} \cdot V_{eff} \cdot Cos(\omega \cdot t + \varphi)$
2. $i(t) = \sqrt{2} \cdot I_{eff} \cdot Cos(\omega \cdot t)$

The amount of power absorbed by impedance Z_L is;

3. $p(t) = v(t) \cdot i(t) = \sqrt{2} \cdot V_{eff} \cdot Cos(\omega \cdot t + \varphi) \cdot \sqrt{2} \cdot I_{eff} \cdot Cos(\omega \cdot t)$

Which is found to be;

4. $p(t) = V_{eff} \cdot I_{eff} \cdot Cos(\varphi) + V_{eff} \cdot I_{eff} \cdot Cos(2 \cdot \omega \cdot t + \varphi)$

The right term in equation 4 $\left(V_{eff} \cdot I_{eff} \cdot Cos(2 \cdot \omega \cdot t + \varphi)\right)$, is sinusoidal and therefore its average value is zero. The frequency of this term is twice the voltage frequency.
The left side term $\left(V_{eff} \cdot I_{eff} \cdot Cos(\varphi)\right)$ is time independent and is always positive. $(0 < \phi < 90^0$

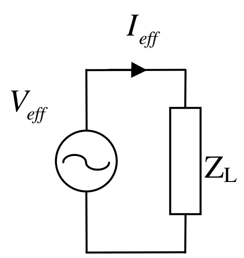
The average power dissipated in the impedance, per cycle, is defined by

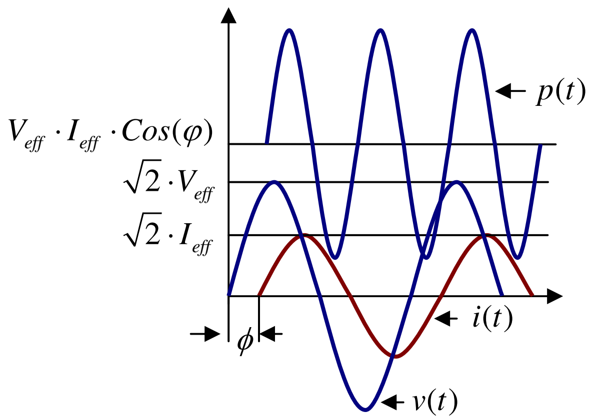
5. $P = \frac{1}{T}\int_0^T p(t)dt$

And is found to be constant

6. $P = V_{eff} \cdot I_{eff} \cdot Cos(\varphi)$

$Cos(\varphi)$ is known to be the "Power Factor"





Mourici Shachter , Holon, Israel, mourici@ walla.co.il

If one uses phasors (complex number) to solve AC circuits, mathematic becomes much simpler but some **result may be understood in a wrong way**.
Phasors representation of voltage and current in both, phasor notation and in time domain is;

7. $v(t) = \sqrt{2} \cdot V_{eff} \cdot Cos(\omega \cdot t + \varphi) \Rightarrow V_{eff} \angle \varphi$
8. $i(t) = \sqrt{2} \cdot I_{eff} \cdot Cos(\omega \cdot t) \Rightarrow I_{eff} \angle 0^0$

Using phasor notation, impedance power consumption S is obtained by multiplying impedance voltage by conjugate impedance current

9. $S = V_{eff} \angle \varphi \cdot \overline{I_{eff} \angle 0^0} = V_{eff} \cdot I_{eff} \angle \varphi$

The absolute value of S is

10. $|S| = V_{eff} \cdot I_{eff}$

$|S|$ is known as Apparent power and is measured in Volt-Ampere [VA]

Using Euler identity $1 \angle \theta \Rightarrow e^{j\theta} = Cos(\theta) + j \cdot Sin(\theta)$ and phasors notation

11. $S = V_{eff} \cdot I_{eff} \angle \varphi = V_{eff} \cdot I_{eff} \cdot Cos(\varphi) + j \cdot V_{eff} \cdot I_{eff} \cdot Sin(\varphi)$

and using equation 9 and 10.

12. $S = P + jQ = |S| \cdot Cos(\varphi) + j \cdot |S| \cdot Sin(\varphi)$

S the Apparent Power is a complex number containing a real part P known as Active Power measured in Watts [W] And an imaginary part Q known as Reactive Power measured in Volt-Ampere Reactive [VAR]

13. $P = V_{eff} \cdot I_{eff} \cdot Cos(\varphi) = |S| \cdot Cos(\varphi)$
14. $Q = V_{eff} \cdot I_{eff} \cdot Sin(\varphi) = |S| \cdot Sin(\varphi)$

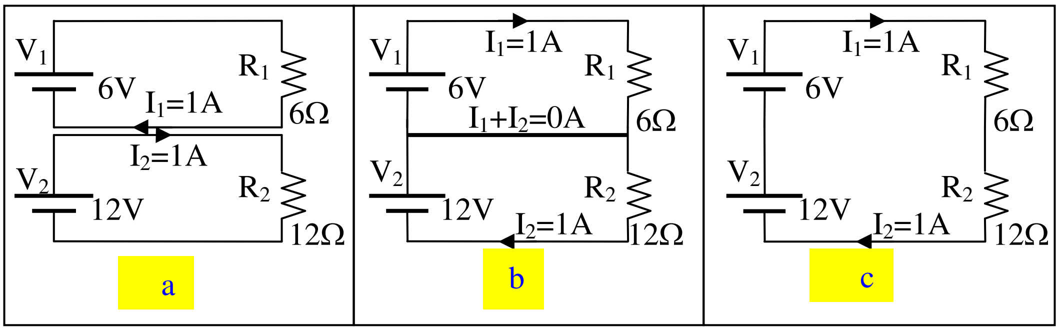
Comparing equation 11 to equation 4, One can conclude that **results in time domain differ from results obtained using phasors.** In time domain reactive power Q is not mentioned at all. Of course the correct results are those obtained in time domain (reality).

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

Chapter 2

Balanced three-phase electric system

The common way to deliver electrical power is known as a three phase electric system. In order to understand why the electric company uses a three phase system, the three circuits in the figures below will be examined



In figure-a, two separated DC sources are connected to two separated resistors, the current in each resistors can be checked to be 1A and the number of wires required to connect the two resistors to both DC voltage source is four.
Sometimes the distance between load and voltage source is far and a common wire is used as shown in figure-b. In that case the number of wires is reduced to three. The current in the common wire is computed using superposition to be just zero Ampere (in that particular example). Electrical technician uses a cooper wire with an area of 1 millimeter square for each 10 Ampere of current (approximately). The current in the common wire is found to be exactly zero so there is no need for a wire at all, as shown in figure-c. One can check that the power delivered to both resistors in fig-b and fig-c is the same as in figure-a but the system in fig-c is cheaper because its requires only two wires
This means that the three circuits are equivalent, because al the measured values are the same

Conclusion

1] There are two kinds of "Zero". Zero that resulting from superposition and 'absolute zero"

2] Absolute Zero (Empty space) or just nothing

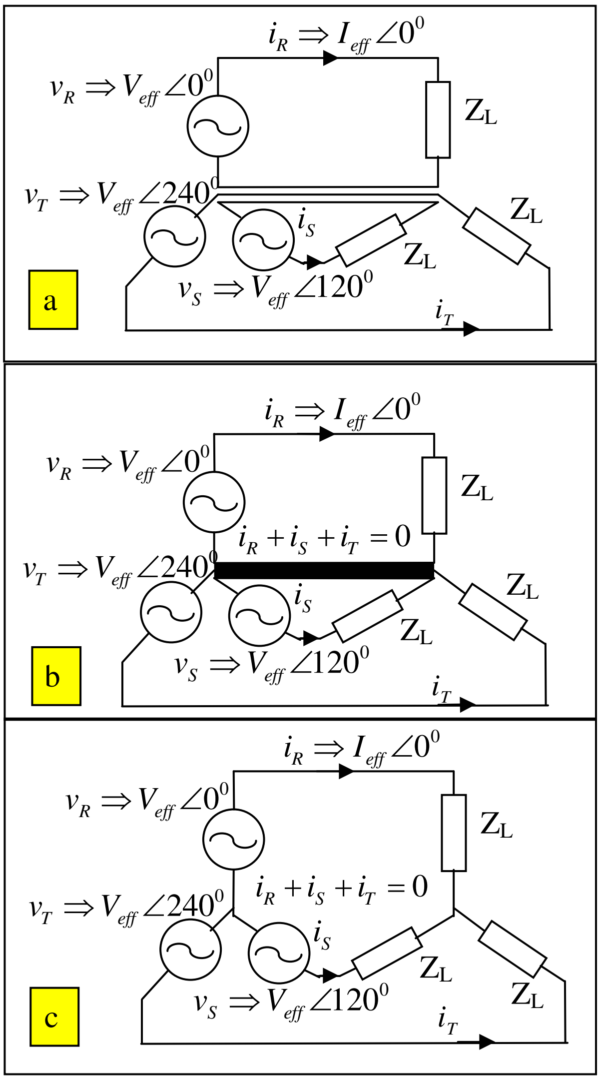
The consequences of "absolute zero" and "superposition zero" will be discussed later
But it is now well understood that supplying electricity, demands very large investments (generators and very long wires) Companies always try to save money.
Three phase electric system save money that the reason that we use those system to deliver electricity

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

Chapter 3

Balanced Three-phase Electrical System

A three-phase Electrical system is described in the figure below. A generator produces three sinusoidal voltages each voltage source is connected to a different load. Six wires are required to connect the loads to the generator. The three voltage sources are with equal amplitude but with different phases $(0^0, 120^0, 240^0)$. A balance load means that the three load are equal, therefore, in each load the current lag or lead the voltage with the same angle φ as in the other loads and the amplitude of



the currents are equal.

The letters R,S,T are used to describe the three voltage sources.

Voltages and currents dependence on time and in phasors notation are as follows;

1. $v(t)_R = \sqrt{2}\cdot V_{eff}\cdot Cos(\omega\cdot t+\varphi) \Rightarrow V_{eff}\angle\varphi$
2. $i(t)_R = \sqrt{2}\cdot I_{eff}\cdot Cos(\omega\cdot t) \Rightarrow I_{eff}\angle 0^0$
3. $v(t)_S = \sqrt{2}\cdot V_{eff}\cdot Cos(\omega\cdot t+120^0+\varphi) \Rightarrow V_{eff}\angle\varphi+120^0$

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

4. $i(t)_S = \sqrt{2} \cdot I_{eff} \cdot Cos(\omega \cdot t + 120^0) \Rightarrow I_{eff} \angle 120^0$

5. $v(t)_T = \sqrt{2} \cdot V_{eff} \cdot Cos(\omega \cdot t + 240^0 + \varphi) \Rightarrow V_{eff} \angle \varphi + 240^0$
6. $i(t)_T = \sqrt{2} \cdot I_{eff} \cdot Cos(\omega \cdot t + 240^0) \Rightarrow I_{eff} \angle 240^0$

Since the distance between the generator and load may be vary far (200km is common) a common wire is used in figure-b and the total number of wires is reduced to be only four weirs.
Using superposition, the current in the common wire is the sum of three current and is found to be zero

7. $i(t)_R + i(t)_S + i(t)_T = 0$

The cause for that is;

8. $\sqrt{2} \cdot I_{eff} \cdot \left[Cos(\omega \cdot t) + Cos(\omega \cdot t + 120^0) + Cos(\omega \cdot t + 240^0) \right] = 0$

The current in a balanced three phase electrical system is found to be zero, so, there is no need for a common wire at all (figure-c). We must keep in mind that this result is achieved only in balanced systems. This is the reason why the electric company makes engineering effort in order to balance load demand.

In a three phase system (as seen in figure- c) instead of six wire, three wires are enough (Saves a lot of money)
The power delivered to the three loads in figure-a is the same as the power delivered to loads in figure-b and figure-c

The power delivered by each voltage sources, as a function of time;

9.
$$p(t)_R = v(t)_R \cdot i(t)_R = \sqrt{2} \cdot V_{eff} \cdot Cos(\omega \cdot t + \varphi) \cdot \sqrt{2} \cdot I_{eff} \cdot Cos(\omega \cdot t)$$
$$p(t)_R = V_{eff} \cdot I_{eff} \cdot Cos(\varphi) + V_{eff} \cdot I_{eff} \cdot Cos(2 \cdot \omega \cdot t + \varphi)$$

10.
$$p(t)_S = v(t)_S \cdot i(t)_S = \sqrt{2} \cdot V_{eff} \cdot Cos(\omega \cdot t + 120^0 + \varphi) \cdot \sqrt{2} \cdot I_{eff} \cdot Cos(\omega \cdot t + 120^0)$$
$$p(t)_S = V_{eff} \cdot I_{eff} \cdot Cos(\varphi) + V_{eff} \cdot I_{eff} \cdot Cos(2 \cdot \omega \cdot t + 240^0 + \varphi)$$

11.
$$p(t)_T = v(t)_S \cdot i(t)_S = \sqrt{2} \cdot V_{eff} \cdot Cos(\omega \cdot t + 240^0 + \varphi) \cdot \sqrt{2} \cdot I_{eff} \cdot Cos(\omega \cdot t + 240^0)$$
$$p(t)_T = V_{eff} \cdot I_{eff} \cdot Cos(\varphi) + V_{eff} \cdot I_{eff} \cdot Cos(2 \cdot \omega \cdot t + 480^0 + \varphi)$$

And it can easily shown that the total power delivered to the three loads as a function of time is constant

12. $P_{3p} = p(t)_R + p(t)_S + p(t)_T = 3 \cdot V_{eff} \cdot I_{eff} \cdot Cos(\varphi)$

the cause for that is;

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

13. $\left[Cos(2\cdot\omega\cdot t+\varphi)+Cos(2\cdot\omega\cdot t+240^0+\varphi)+Cos(2\cdot\omega\cdot t+480^0+\varphi)\right]=0$

The total reactive power in a three phase balanced system is zero momentarily (Not on the average)
But we have to remember that in each single phase the power is sinusoidal

If we use phasors notation we get a wrong physical answer, the power in each load is computed as follows

14. $S_R = V_{eff}\angle\varphi\cdot\overline{I_{eff}\angle 0^0} = V_{eff}\cdot I_{eff}\angle\varphi$
15. $S_S = V_{eff}\angle\varphi+120^0\cdot\overline{I_{eff}\angle 120^0} = V_{eff}\cdot I_{eff}\angle\varphi$
16. $S_T = V_{eff}\angle\varphi+240^0\cdot\overline{I_{eff}\angle 240^0} = V_{eff}\cdot I_{eff}\angle\varphi$

The total power consumed by the three loads is therefore

17. $S_{3p} = P + jQ = 3\cdot V_{eff}\cdot I_{eff}\angle\varphi$

18. $S_{3p} = P + jQ = 3\cdot V_{eff}\cdot I_{eff}\cdot\left[Cos(\varphi)+j\cdot Sin(\varphi)\right]$

and the reactive power Q;

19. $Q_{3p} = 3\cdot V_{eff}\cdot I_{eff}\cdot Sin(\varphi)$

Equation 12 and 13 contradict equations 18 and 19. As mentioned before; **reality is in time domain**. Reactive power in each phase is Q but the sum of reactive power in three phase is summed to zero not $3\cdot Q$ (see equation 13.)

Conclusion
The reactive power Q obtained using phasors, differ from the real situation in a three phase system as obtained in time domain
(This conclusion is correct for balanced or non balanced three phase systems)

Comment
Any multi phase system that may contain 2, 3, 4, …..N phase behaves like a 3 phase system. A 3-phase system is only the most popular

---

Chapter 4
Mechanical to electrical power conversion

By definition, Generators convert mechanical energy to electrical energy and motor do it the opposite direction.
There are three types of machines; DC machine, synchronous machine and induction (asynchronous) machine. Each type of machine can be a generator or a motor. If electric power flow from the machine to load then the machine is assumed to work as

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

a generator. If electric power flow into the machine and produces mechanical power then the machine is assumed to be a motor
In the figure on the next page , a three phase generator is electrically connected to a motor of the same size.

Assume both machines are perfect (energy conversion efficiency defined as $\frac{P_{OUT}}{P_{IN}}$ is 100%) (Real machines have 95%-98% efficiency)

Relation between power and torque for a rotating machine is given in physic lectures to be;

1. $P = T \cdot \omega$

where P is power in Watts, T torque (moment) in Newton-Metter and $\omega = 2 \cdot \pi \cdot n$ in radian per second
n is the mechanical shaft rotating speed in revolution per second (rps) (<u>not rpm</u>)
From now later on, three new indexes are widely used
<u>M for motor, G for generator and E for electrical power</u>
If P_M is motor power consumption, its torque is T_M and motor shaft speed is

2. $\omega_M = 2 \cdot \pi \cdot n_M$

Thetn;

3. $P_M = T_M \cdot \omega_M$

At steady state operation, P_M is constant (constant speed constant mechanical load)
Similar expression are obtained for the generator

4. $P_G = T_G \cdot \omega_G$

Since system efficiency is 100% and that the reason motor and generator are almost, the same size.

5. $P_E = P_M = P_G$

The electric power that flows in a balanced three phase electric system was found in previous chapter to be

6. $P_E = 3 \cdot V_{eff} \cdot I_{eff} \cdot Cos(\varphi)$

and combining equations 4 and 5 yields

7. $T_M \cdot \omega_M = T_G \cdot \omega_G = 3 \cdot V_{eff} \cdot I_{eff} \cdot Cos(\varphi)$

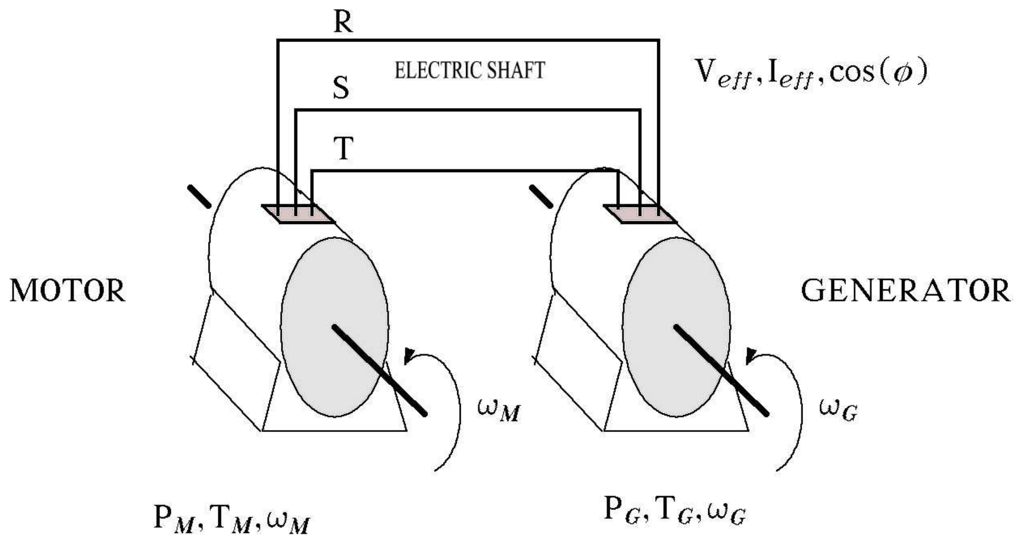
Mourici Shachter , Holon, Israel, mourici@ walla.co.il

Conclusion

The last equation (equation 7) seems to be O.K but its' not. There is no way to equate uniquely two measurable terms T_M, ω_M on the left side of equation 7 with three measurable terms $V_{eff}, I_{eff}, Cos(\varphi)$ on the right side. Left side of equation 7 describe a two dimension space , the right side is three dimensions space the left side behave like two dimension shadow of a three dimension body.
In matrix form

$$8. \quad \begin{bmatrix} V_{eff} \\ I_{eff} \\ Cos(\varphi) \end{bmatrix} = \begin{bmatrix} \kappa \cdot \Phi & 0 \\ 0 & 1/(\kappa \cdot \Phi) \\ ? & ? \end{bmatrix} \cdot \begin{bmatrix} \omega_M \\ T_M \end{bmatrix}$$

One can recognize two term that are widely used with DC machines and were found



experimentally but no one have pay attention to $Cos(\varphi)$

Another drawback of all the equations above is their disability to explain, how a constant power constant torque and constant rotation speed of motors and generators shafts produces alternate current and voltage at a certain frequency and phase

---

I claim that the well known equations

$$E = \kappa_E \cdot \Phi \cdot n$$

$$T = \kappa_T \cdot \Phi \cdot I$$

that describe DC machine , and every student at the engineering school find experimentally are wrong and unfortunately approximately correct , The correct equations will be derived in the next chapter.

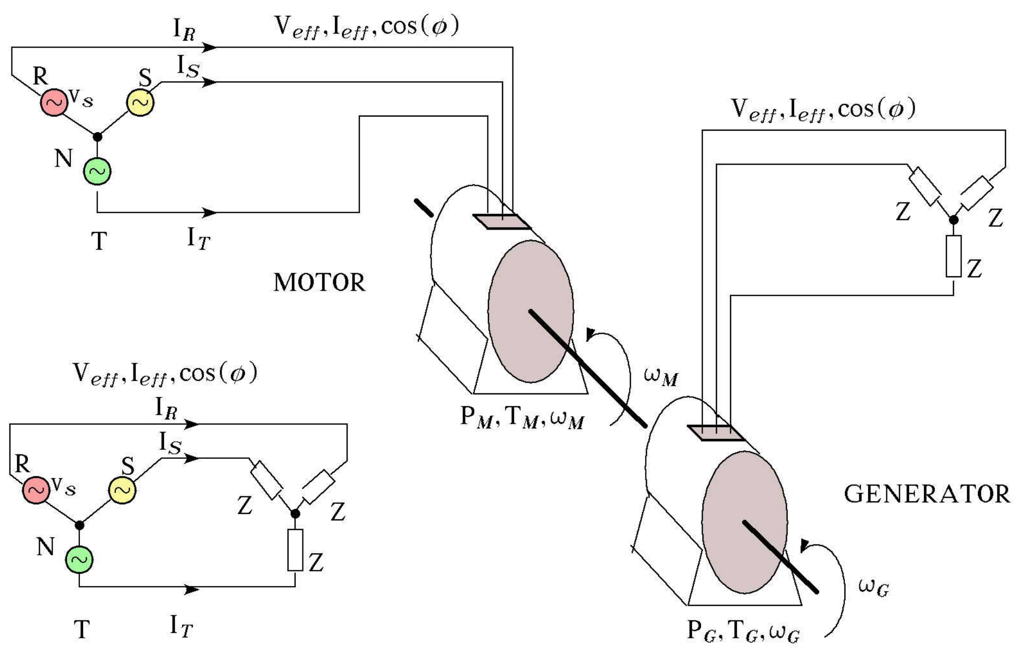
Mourici Shachter , Holon, Israel, mourici@ walla.co.il

Chapter 5

Mechanical to electrical power conversion in correct form

The next example will sharpen the problem discussed in previous chapter and will lead us to a unique solution that fits vary well experimental results.

In the figure below electric energy is transferred into mechanical energy and then back to electric energy in order to supply the balanced load (Z), (assume perfect machines and a generators that reproduces source voltage V_S) Of course, the balanced load Z can be connected directly to the three phase source eliminating machines usage. It is claimed that the two systems are equivalent because in both system one gets the same results. (Professor Einstein use the same procedure to derive General Relativity)



Suppose now that each impedance Z is an ideal coil (with zero resistance) such that

1. $Z = j \cdot \omega \cdot L$

Coils consume only reactive power and the current in a coil lags voltage by 90^0 so

2. $\varphi = 90^0$
3. $P_E = 3 \cdot V_{eff} \cdot I_{eff} \cdot Cos(\varphi) = 0$

Since system efficiency is 100% and from equation 3.

4. $P_E = P_M = P_G = 0$

Which mean that motor shaft does not deliver any power and torque to the generator shaft. But magically one can measure voltage and current across load Z

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

If there is no power and torque on the mechanical shaft one can disconnect the motor from the generator but as a result there will not be any voltage and current across the electric load which is not the case when motor and generator are connected
This prove experimentally that absolute zero and superposition zero are not the same

---

Conclusions

1. When motor and generators are disconnected the system obeys absolute zero
2. When motor and generators are connected the system obeys superposition zero

---

In order to overcome this ambiguity let assume that the motor shaft is described as a **three phase mechanical** system obeying the same rules and have the same properties as in the three phase electrical system
(Professor Einstein claimed that in every system of reference the rules are the same)
Let define a "mechanical voltage" $\omega_M(t)$ (rotating speed in rps) with an effective value W_{eff} and a "mechanical current" (Torque in Newton-meter) $\tau(t)_M$ with an effective value Υ_{eff} that has the ability to vary as current and voltage varies in time, in the electrical system (see eq 1 and 2 in chapter 1).
In the electrical system there are three circuits. Let the mechanical system have also three mechanical systems
(indexes M for mechanical, R,S,T phases names)

5. $\omega(t)_{M,R} = \sqrt{2} \cdot W_{eff,M} \cdot Cos(\omega \cdot t + \varphi_M)$
6. $\tau(t)_{M,R} = \sqrt{2} \cdot \Upsilon_{eff,M} \cdot Cos(\omega \cdot t)$

7. $\omega(t)_{M,S} = \sqrt{2} \cdot W_{eff,M} \cdot Cos(\omega \cdot t + 120^0 + \varphi_M)$
8. $\tau(t)_{M,S} = \sqrt{2} \cdot \Upsilon_{eff,M} \cdot Cos(\omega \cdot t + 120^0)$

9. $\omega(t)_{M,T} = \sqrt{2} \cdot W_{eff,M} \cdot Cos(\omega \cdot t + 240^0 + \varphi_M)$
10. $\tau(t)_{M,T} = \sqrt{2} \cdot \Upsilon_{eff,M} \cdot Cos(\omega \cdot t + 240^0)$

(Equation 5 to equation 10 in this chapter are analog to equation 1 to equation 6 in chapter 3) (look carefully to understand Einstein's idea)
The total mechanical power is computed using a procedure describe in chapter 3
And is found to be

11. $$P_M = p_R + p_S + p_T = \tau_{MR} \cdot \omega_{MR} + \tau_{MS} \cdot \omega_{MS} + \tau_{MT} \cdot \omega_{MT} = 3 \cdot W_{effM} \cdot \Upsilon_{eff} \cdot Cos(\varphi_M)$$

we have found previously that

12. $P_E = P_M = P_G$

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

from equation 3 in this chapter

13. $P_E = 3 \cdot V_{eff} \cdot I_{eff} \cdot Cos(\varphi)$

and from equation 11 in chapter 4

14. $P_M = T_M \cdot \omega_M = 3 \cdot W_{eff,M} \cdot \Upsilon_{eff,M} \cdot Cos(\varphi_M)$

equating 12 ,13 and 14 yield

15. $T_M \cdot \omega_M = 3 \cdot W_{eff,M} \cdot \Upsilon_{eff} \cdot Cos(\varphi_M) = 3 \cdot V_{eff} \cdot I_{eff} \cdot Cos(\varphi)$

Now the middle term in equation 15 describing mechanical power has three independent variables like the right term describing electrical power.
and according to experimental results the following relation become useful

16. $Cos(\varphi_M) = Cos(\varphi)$

which means that there exist a mechanical Power Factor that must be equal to the electrical Power Factor
other relations that resulting from equation 15 are

17. $V_{eff} = \kappa \cdot \Phi \cdot W_{eff,M}$

18. $I_{eff} = \dfrac{1}{\kappa \cdot \Phi} \cdot \Upsilon_{eff,M}$

19. $\omega_M = W_{eff,M}$

20. $T_M = 3 \cdot \Upsilon_{eff,M} \cdot Cos(\varphi_M)$

At this stage, $\kappa \cdot \Phi$ is a constant written as a product of two other constants;
Φ is the magnetic flux in the machine. and κ is a constant of proportion introduces to fit physical dimension
Equation 17 to equation 20 can be represented in matrix notation

21. $$\begin{bmatrix} V_{eff} \\ I_{eff} \\ Cos(\varphi) \end{bmatrix} = \begin{bmatrix} \kappa \cdot \Phi & 0 & 0 \\ 0 & \dfrac{1}{\kappa \cdot \Phi} & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} \omega_M \\ \dfrac{T_M}{3 \cdot Cos(\varphi_M)} \\ Cos(\varphi_M) \end{bmatrix}$$

the left side three dimensional column vector contains all we need to know and can actually measure, concern to electricity side of the machine while the right side three dimensional column vector contains all we need to know and can actually measure concern to mechanical side of the machine . $Cos(\varphi_M)$ is actually difficult to measure, fortunately $Cos(\varphi)$ on the electrical side can be easily measured and is equal to $Cos(\varphi_M)$ as was proven above.

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

It is important to mention that in text book about electrical machines one can find a matrix representation like this one used to describe DC machines and was proved in this article, to be wrong.

22. $$\begin{bmatrix} V_{eff} \\ I_{eff} \end{bmatrix} = \begin{bmatrix} \kappa \cdot \Phi & 0 \\ 0 & \dfrac{1}{\kappa \cdot \Phi} \end{bmatrix} \cdot \begin{bmatrix} \omega_M \\ T_M \end{bmatrix}$$

In those books one can find the statement that "rotor current in electric machines is proportional to the torque" this statement is correct only when $Cos(\varphi) \approx 1$
The correct equation for three phase machine is

23. $$T_M = 3 \cdot Cos(\varphi) \cdot \kappa \cdot \Phi \cdot I_{eff}$$

Conclusion
The main achievement of this chapter is the discovery of power factor $Cos(\varphi_M)$ in mechanical system that transfers energy to three phase (multi-phase) electric system. The exact relation among electric measurable parameters and the mechanical measurable parameters was formulated exactly without knowing the exact detail of how electrical machines are constructed.

This example prove also that Physics can not relay only on experiments.

Conclusion
Most real Motors are three phase motors. But the mathematics can describe systems with more phases . All the equation and conclusion can be applied to a N phase machine and N can go to infinity

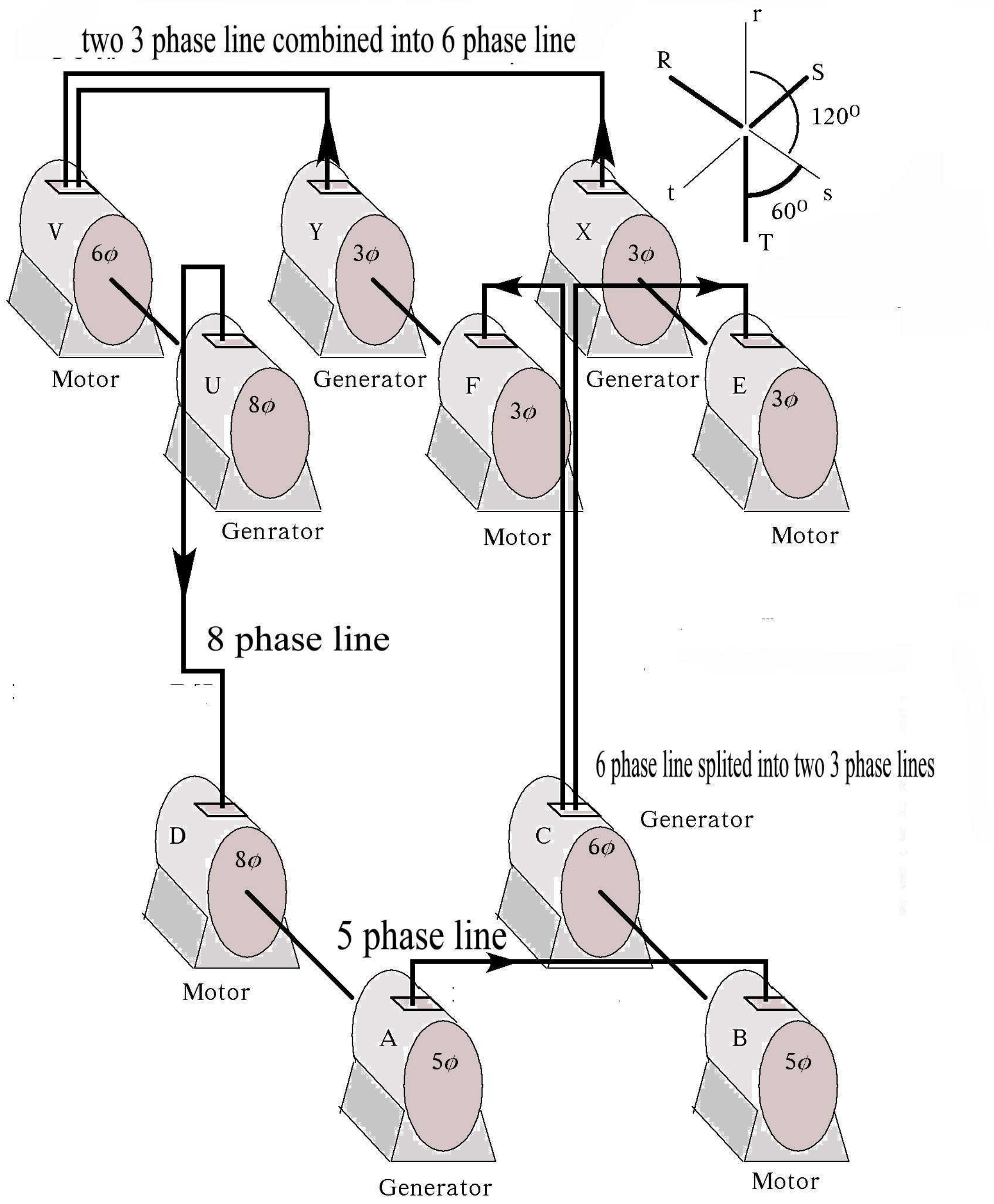
---

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

Chapter 6

PERPETUAL MOBILE

Assume that all machines in the complex system in the picture below are perfect (energy conversion efficiency defined as P_{OUT}/P_{IN} is 100%) Since machines are perfect there is no loss of energy and the whole set is wired to allow energy to flow around without disturbance. The overall energy of the system is zero. The system has an average zero not an absolute zero. The machines can be connected in many ways and still obey average zero. Each connection is a "connection state". All machines will rotate for ever. And since speed of an AC machine depends on the electric line frequency and depends also on number of poles, each pair may have a different shaft speed.



Mourici Shachter , Holon, Israel, mourici@ walla.co.il

Conclusion

Since number of phases in a round machines must be an integer , the number of phase quantizes the system.

The task of a motor generator pair in that system is to transfer energy while changing the number of phases; For example motor D is an 8 phase motor connected to 5 phase generator A. Generator C is 6 phases its wires are divided into two 3 phase groups of wires that feed motor F and E.

The wiring diagram of the system is call a **"connection state"** and suppose that the wiring can change such that energy flow is not disturbed

in the scheme above a "state" obey some rules

1. All the energy circulated according to the law of conserving of energy
2. All machines are connected in so called "legal connection" taking into account number of phase and how they can be divided into phase's subgroups. Generator number of phase must match motor number of phase or Generators wires can be grouped in such a way to feed two or more motors. (see how generator C feed motor F and E
3. Two or more generator can help each other in order to feed a many phase motor (See how generators X and Y feed motor V)
4. Machines can be divided into group and energy can be shared among those group in order to maintain their movement

Conclusion

A machine set connected as described in the scheme is useless from the engineering point of view. But will be of enormous important to physics.

Suppose an electron behaves like a 2 phase machine and a hydrogen atom behaves like a 4 phase machine and an oxygen atom like an 80 phase's machine. Each element in the periodic table behaves like a machine with different number of phases. And atoms are connected with invisibles wires (electromagnetic waves). Fortunately the number of atoms of any kind is very large, so, the number of allowed "states" is large. The probability that a state occurs depend on the previous state because only adjacent machines reacts to change state (this create history). Far (not adjacent) machines can not interact to change state of course mind cannot interact with those machines or more accurately mind thus not interact with matter as magicians wants.

The probability that adjacent generators will cooperate to feed a many phase motor is rare (See how generators X and Y feed motor V) machines that contains many phase will be rare and may disappear on the next state

Motors and generators can rotate CW or CCW. For few phase machines the probability that the machine rotate in one direction or in opposite direction is equal. The probability that in some region machines will rotate in one direction not in the opposite direction will occur most often when machines with few number of phase cooperate with a machine with many phase what ones get is an **asymmetry**

Their is also a probability that a "string of states" will repeat again and again may be that what we believes to be "life" is such "strings of states"

Mourici Shachter , Holon, Israel, mourici@ walla.co.il

A "Universe" is a group of motor generator pair that obey energy conservation law and all machines are wired together (Atoms are wired with "electromagnetic wave" not real wires, therefore changing "states" is very easy and very fast)
From mathematical point of view the energy that all the motors consumes equals the energy that all the generators produce the sum of energies in a "Universe" is zero the dynamics inside the "Universe" is achieved due to "superposition zero" discussed in chapter 2
If one try to looks on another's "Universe" not the "Universe" he lives in, he sees the all amount of the other "Universe" energy which appear to him as an "Absolute zero" so he does see nothing. If one wants to see a universe he must be a part of that universe.

Chapter 7
How universe was created
An assumption

Actual machines are made of iron cupper wires connections plastics an so on. But I had never mentioned that at all. What I told you is that an energy conversion system cans covert electrical energy to mechanical energy or mechanical energy to electricity
The simplest way to understand what is universe is as following;
Suppose we want to make an hat from a sheet of paper. What we need is a book that explains how to make Origami. The book will instruct us how to fold the plain paper into a nice hat. We can fold paper to make a boat or fold the paper to make a dog and so on. We than can, using Origami techniques, change the hat into a boat a dog a flower and so on, One sheet of paper can be folded to create a lot of shapes, depends how big is that sheet of paper.
Suppose now universe is something like a sheet of paper, It is an electromagnetic plan wave with 4 or more dimension (for example $x, y, z, i \cdot c \cdot t$) That plain is folded to create huge number motor-generators pairs that are actually folded (wired) into the complexity of our universe just as described above.
At the beginning a flat infinite plane (An electromagnetic plan wave that obey Maxwell Equations and as a result obeys Relativity and Quantum Mechanics) is folded into delicate motor-generator pairs, such as photons quarks and so on (light particles). Later a group of light particles create elementary elements as appears in the periodic table and then stars galaxies and so on are created. The Universe is an infinite plan folded to create everything. Physics believe in experimental evidence Physics universe has many particle of many kind with many laws.(Standard model) **It make no sense**. My model for universe is logical and simple , of course , not physical

Mourici Shachter , Holon, Israel, mourici@ walla.co.il