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CHAITANYA MEDICAL FOUNDATION'S

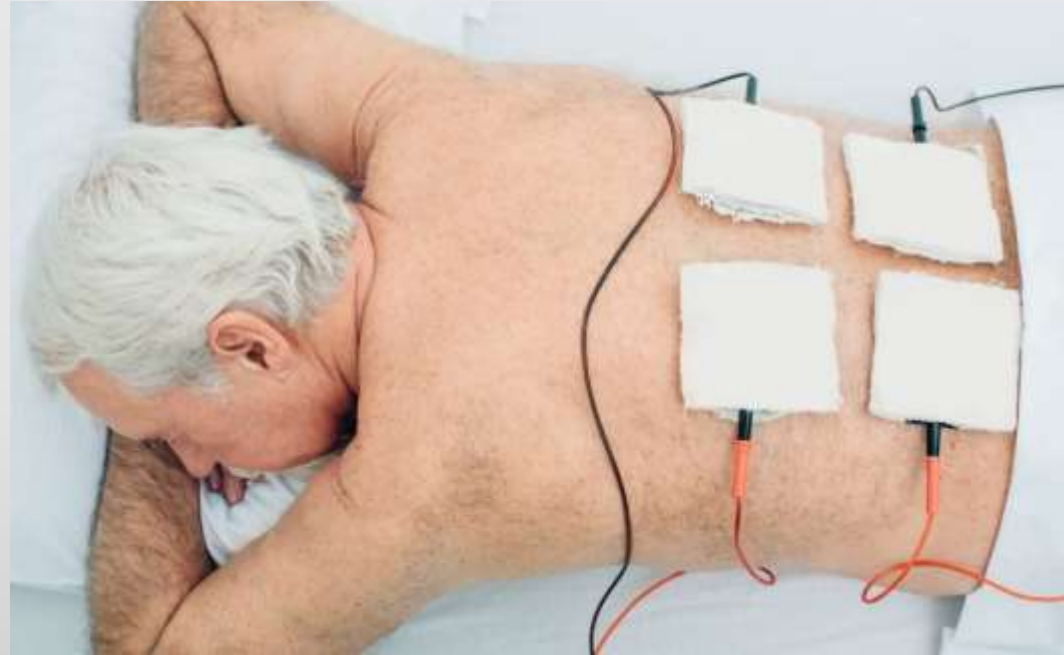
## **College of Physiotherapy**

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**Affiliated to:** Maharashtra University of Health Sciences, Nashik

- Topic: Interferential Therapy(IFT)
- Class: First BPTTh
- Subject: Fundamental of electrotherapy
- Faculty: Dr. Chintan Solanki – MPT(neurology)

# INTERFERENTIAL THERAPY



Dr. Chintan Solanki – MPT(neurology)

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CMF's college of physiotherapy, Pune

# CONTENT

- DEFINATION OF IFT
- PRINCIPLES
- PRODUCTION
- PARAMETERS AND ELECTRODE PLACEMNET
- PHYSIOLOGICAL EFFECT , INDICATION, CONTRAINDICATION AND DANGERS OF IFT
- TESTING OF APPARTUS

# MEDIUM FREQUENCY CURRENT

- medium-frequency alternating currents typically ranging from **1,000 Hz to 10,000 Hz.**
- advantages of medium frequency current over lower frequency current ??
  - ✓ deep tissue penetration
  - ✓ Reduce skin resistance - more efficient transmission of electrical energy to the target tissues.
  - ✓ Selective Stimulation
  - ✓ Increased comfort

# INTRODUCTION

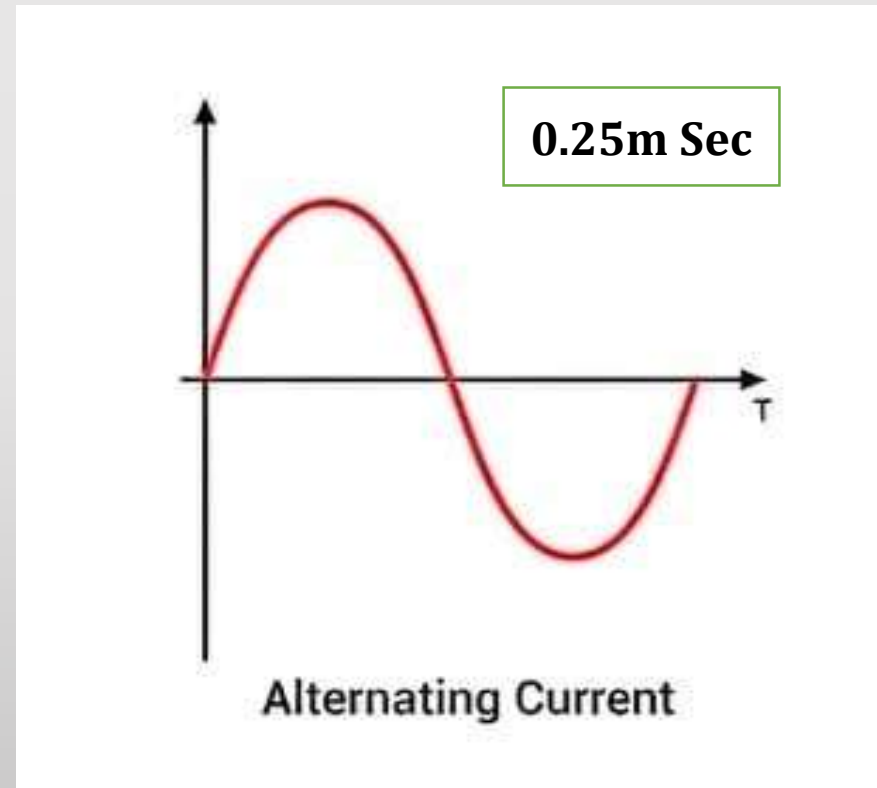
- **Definition** : Interferential therapy (IFT) is a form of electrical treatment where two alternating medium-frequency currents, slightly out of phase, are transcutaneous applied to produce an amplitude modulated low frequency.
- IFC therapy was developed by Dr. Hans Nemec in the early 1950s in Vienna and has since been extensively used in Europe.
- IFC is also called as '**Nemec's current**'
- This therapy is used for therapeutic purposes such as pain relief, improving circulation, and enhancing the healing process.

- The aim of crossing two medium-frequency alternating currents was to utilize the concept that the skin offers little ohmic resistance to the passage of medium frequencies (two digits), whereas direct currents and low frequencies encounter very high ohmic resistance (between 2000 and 4000 ohms)

$$Z=1/2\pi fC$$

Z- impedance in ohm, f – frequency in hertz, c- capacitance of skin in microfarad

# CYCLE SHAPE AND DURATION



Alternating bidirectional  
current with mean value of  
Zero  
Duration of cycle is 0.25m Sec ,  
for 4000Hz current

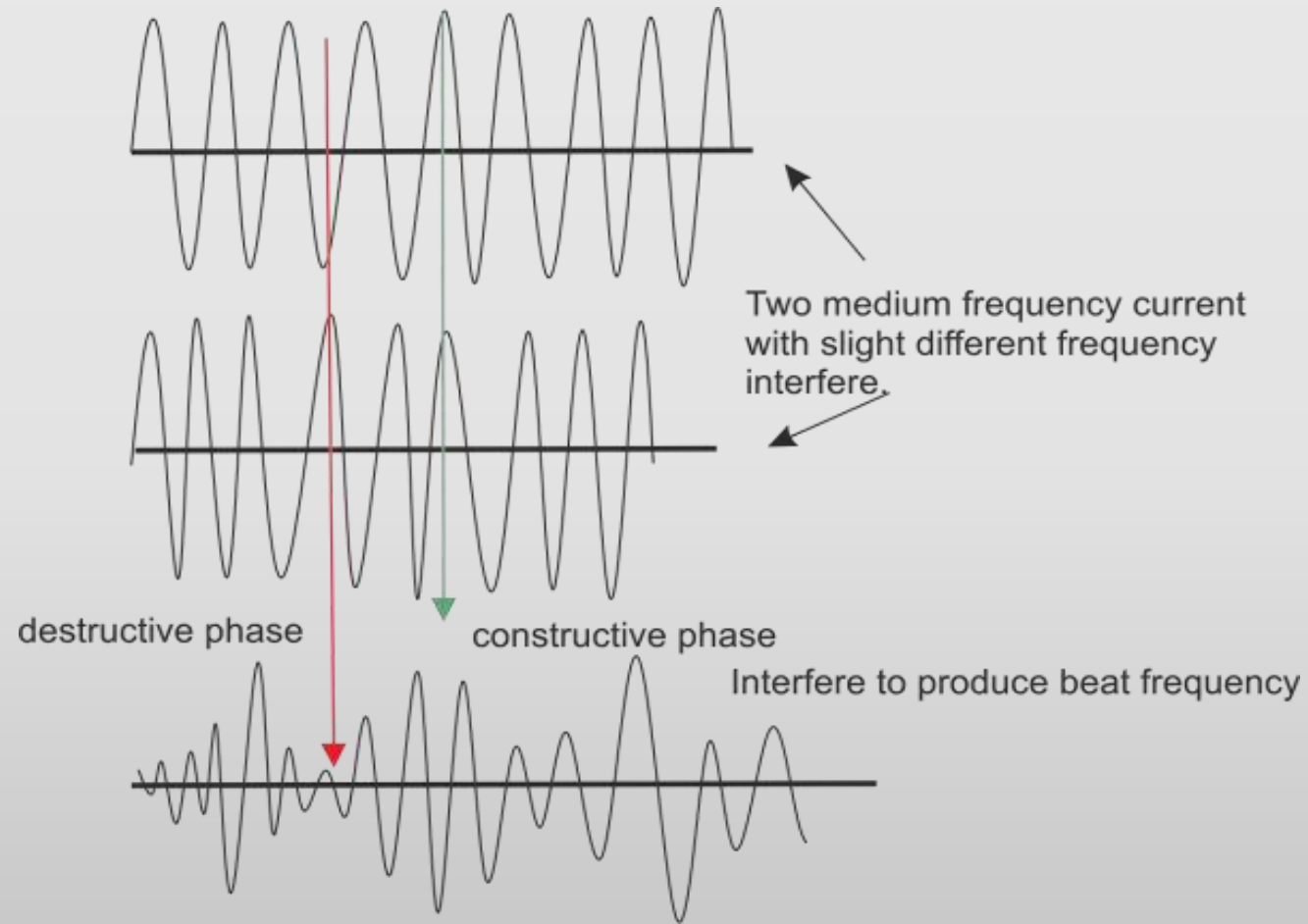
# PRINCIPLE

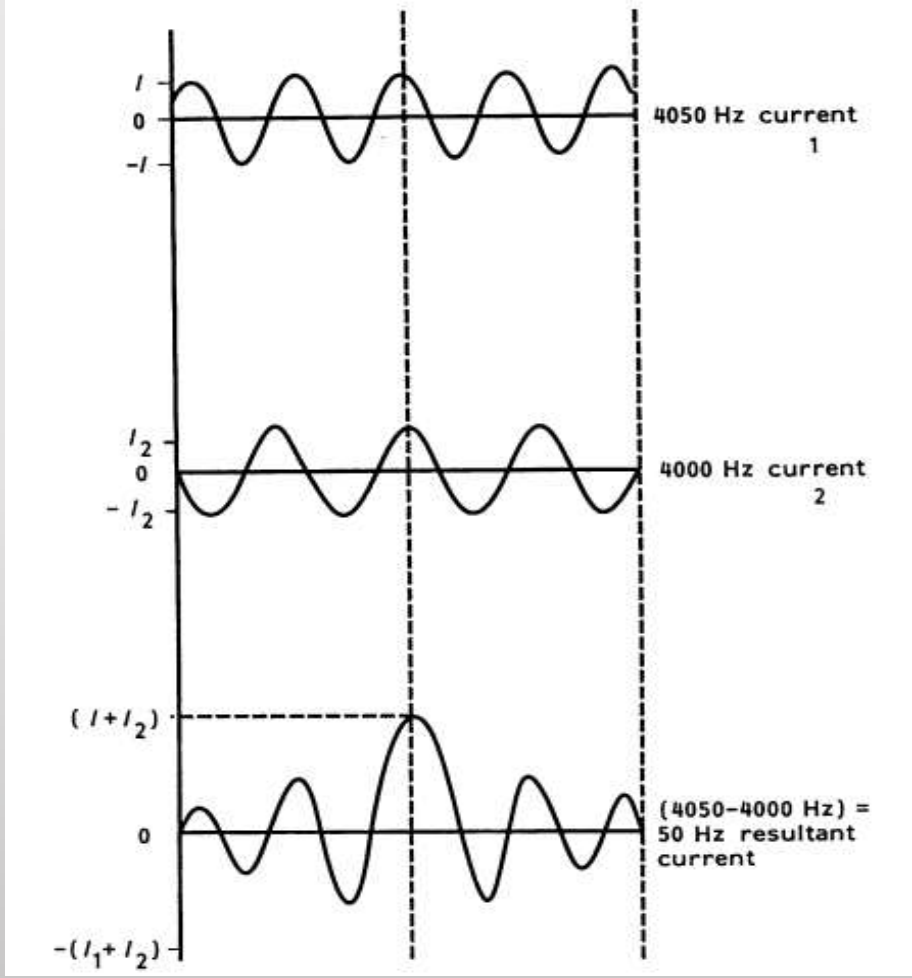
It works on principles of interferential effect of two medium frequency current crossing in the patients tissue

- **CONSTRUCTIVE INTERFERNECE:** two sinusoidal waves; exactly in phase, the waves supplement each other
- **DESTRUCTIVE INTERFERENCE:** two waves are different by  $\frac{1}{2}$  a wavelength the result is cancellation of both waves

Blending of waves caused by constructive and destructive interference produce a beat frequency / Amplitude modulated frequency (AMF)



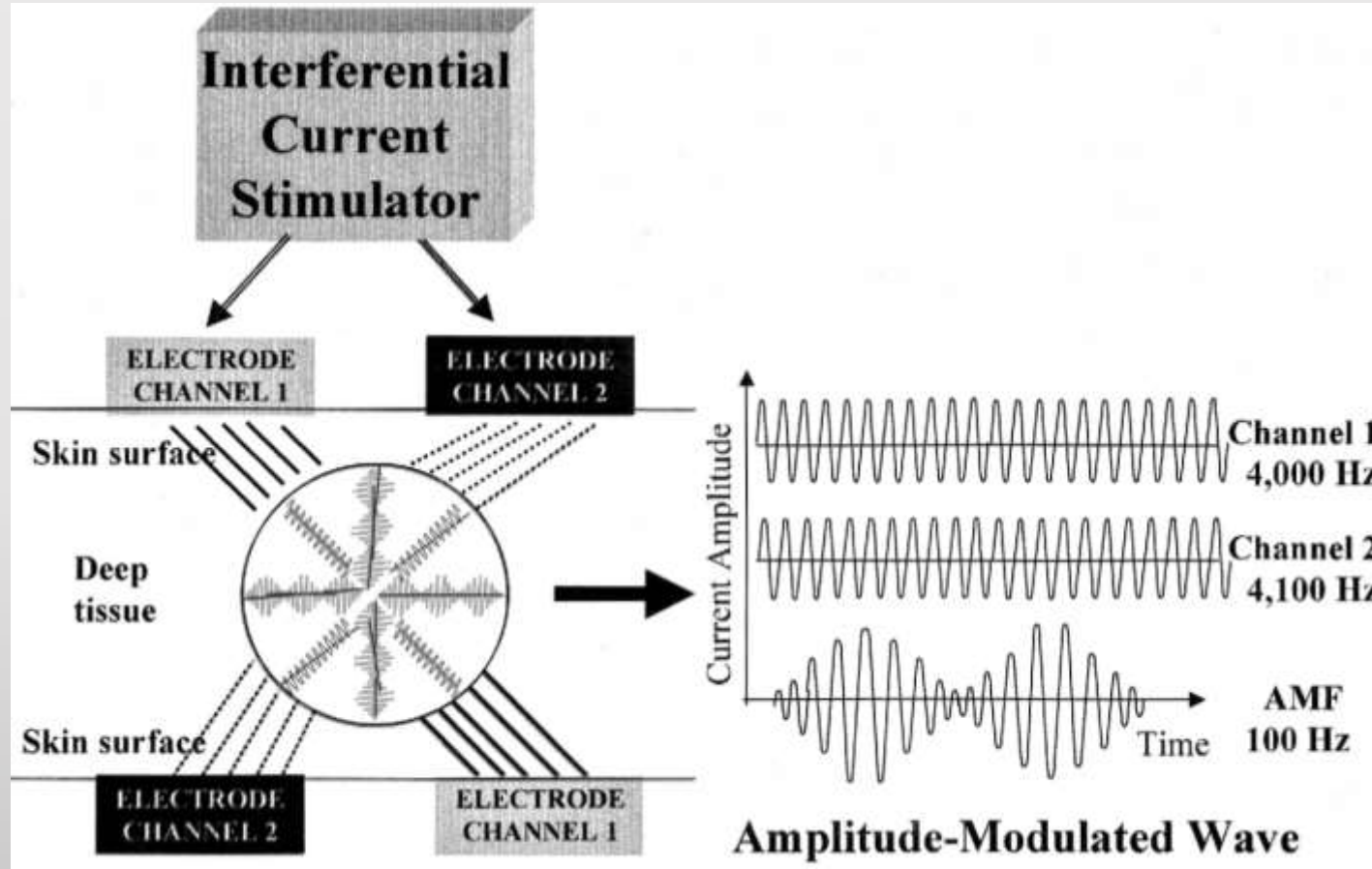




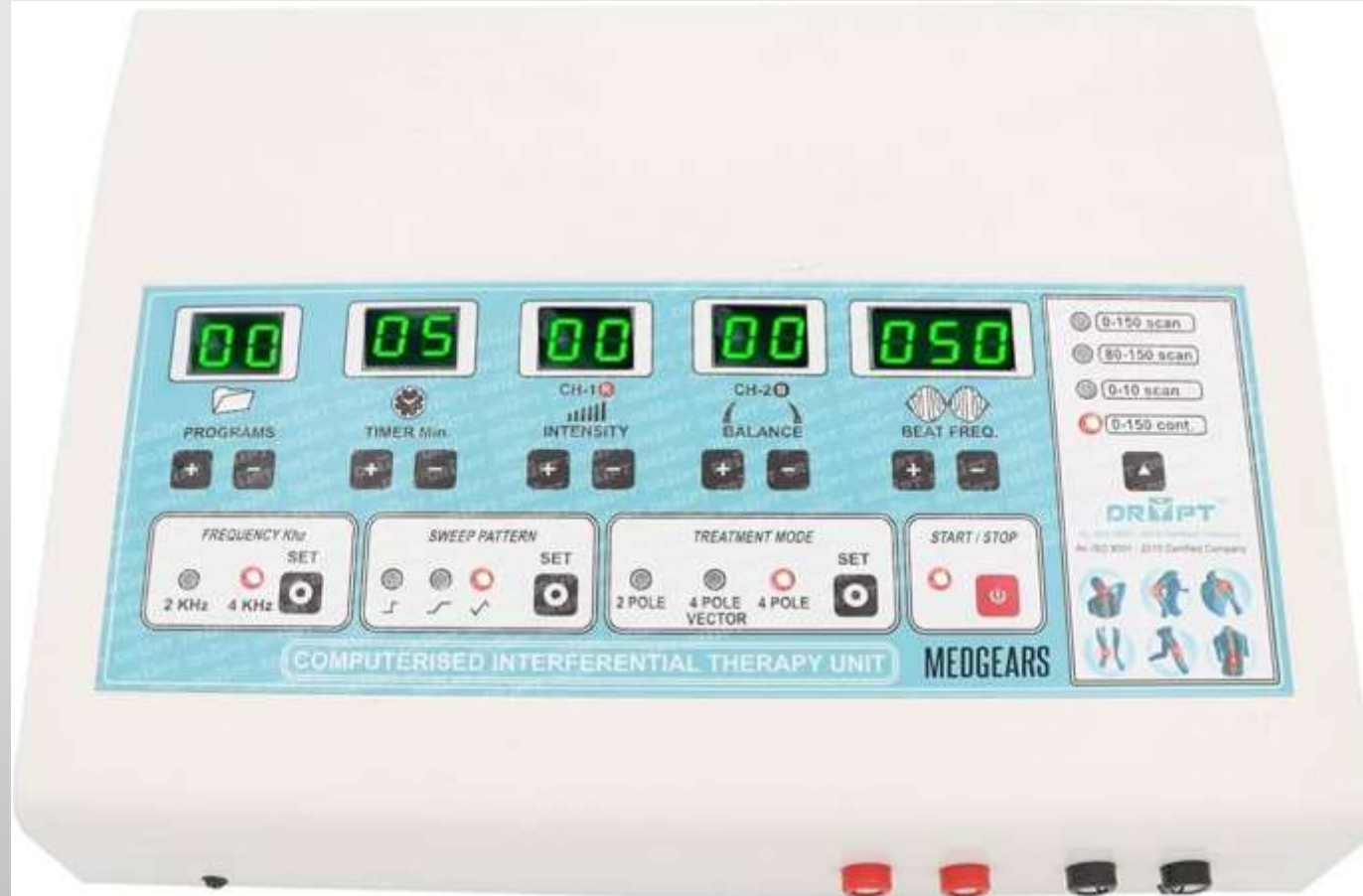
# PRODUCTION

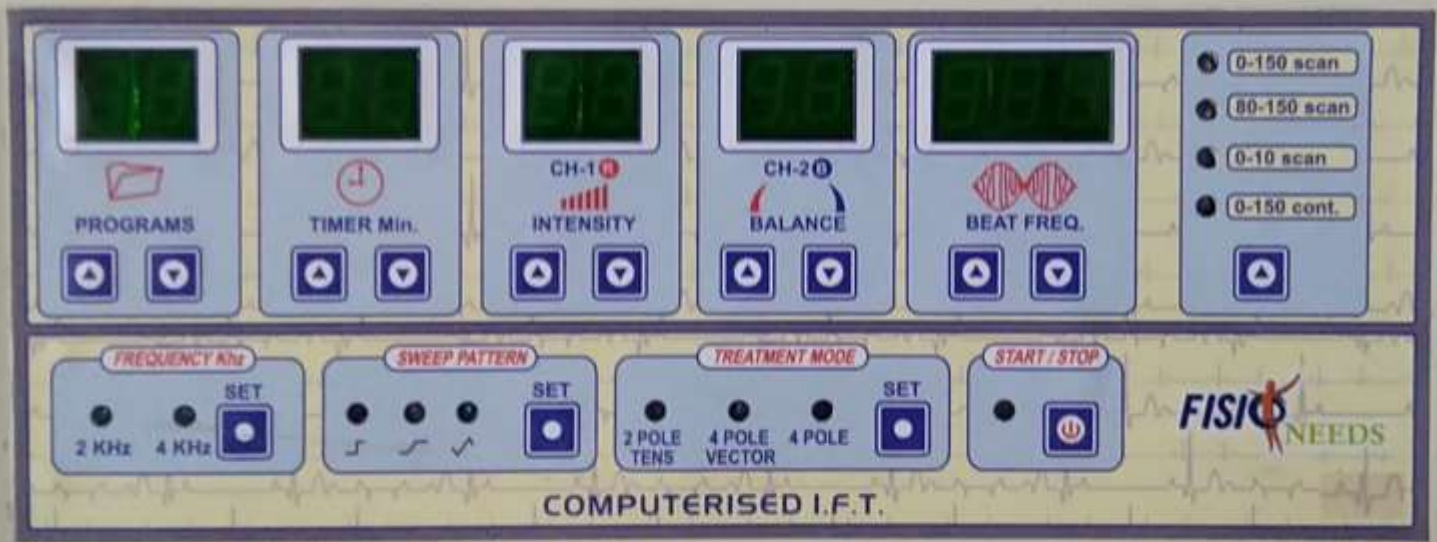
- Two medium frequency currents, current in circuit A = 4,000 Hz and circuit B = 3,900 Hz. Where these two currents are applied to the tissues, at the point where the currents cross over, a new beat frequency current is set up whose amplitude is modulated and the frequency of new current is called beat frequency (interferential current) and that is 100 Hz .
- Carrier frequency :  $F1+F2/2 = 4000 + 3900 /2 = 3950$  Hz
- Beat frequency/AMF :  $F1 - F2 = 4000 - 3900 = 100$  Hz

- By varying the frequency of the second channel relative to the constant frequency of the first, this is possible to produce a range of beat frequencies deep in the patient's tissues
- Frequency swing in which a rhythmical progression is made through the full range of beat frequencies. If range of 0-100Hz is required this is achieved by varying the frequency in second circuit between 3900 to 4000 Hz over a period of 5 – 10 seconds.



# PANEL DIAGRAM





# PARAMETERS AND ELECTRODE PLACEMENT

- Amplitude modulated frequency
- Sweep/ frequency modulation/ swing
- Quadripolar/bipolar application
- Vector/ scanning mode
- Current intensity
- Duration



# AMPLITUDE MODULATED FREQUENCY

- LOW AMF (5 Hz) produce beating or tapping sensation
- Higher AMF (50 -100 Hz) produce buzzing or tingling sensation

# FREQUENCY MODULATION/ SWING

- "SWEEP" frequency control which enables the resultant AMF frequency to SWEEP automatically and continuously with a maximum of 100 Hz over and above the present "BASE" treatment frequency (This base and SWEEP frequency can be a maximum of 250 Hz).
- The SWEEP can be programmed to vary in one of three rise and fall rates
- The time and the pattern of this modulation is usually adjusted and called as the spectrum, Advantages of Spectrum:
  1. Reduce nerve adaptation
  2. Allow stimulation of greater range of excitable tissues

## Rectangular program 1/1

- The oscillation retains the present base frequency for one second, than switches instantly to the sum frequency which is also retained for one second. The frequency then return to the present base frequency, and cycle repeats. This waveforms is strong and aggressive and broader.
- This program is recommended for chronic complaints demanding rigorous treatment.

## **Trapezoidal program 1/5/1/5**

- The oscillation retains the preset base frequency for five seconds, climbs during one second to the sum frequency, retains the sum frequency for five seconds and then swings down to the present base frequency during one second. The cycle then repeats.
- This program is much milder, and applicated to patients with acute and sub-acute complaints.

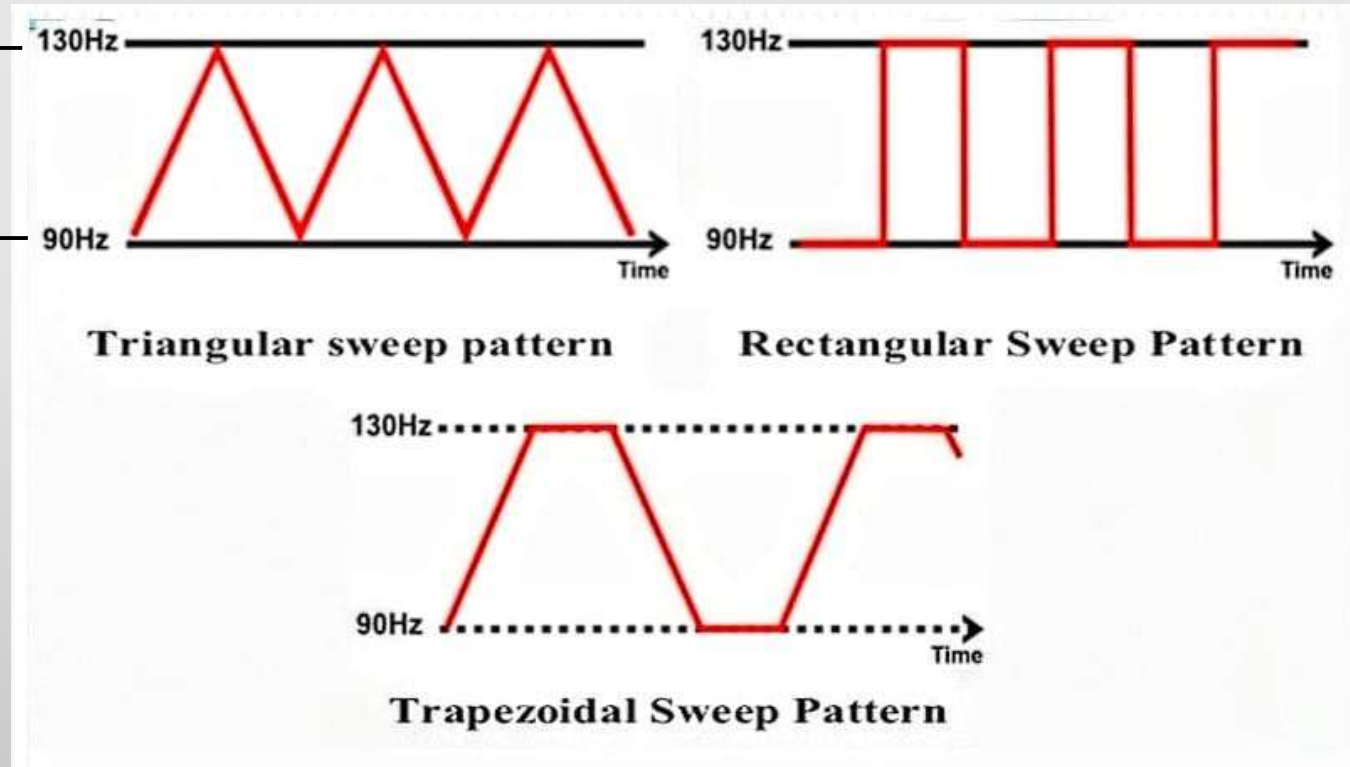
## Triangular program 6/6

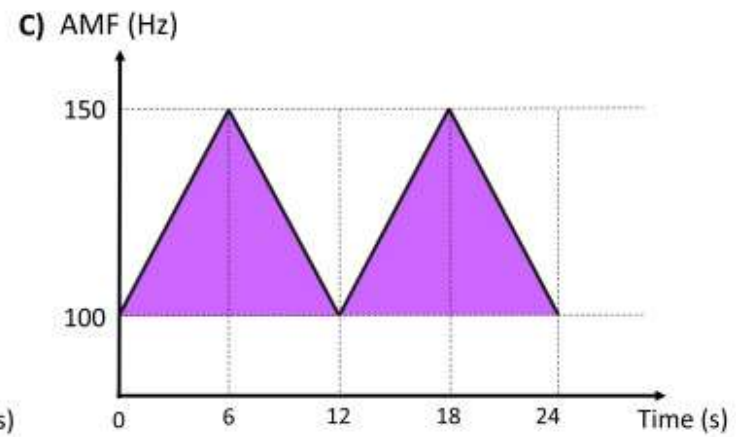
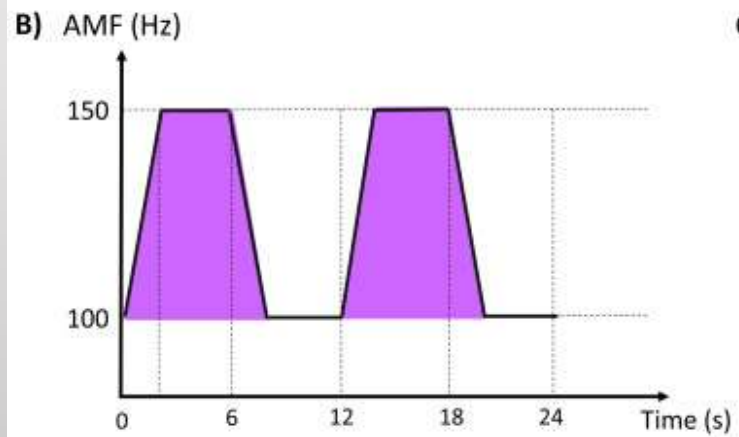
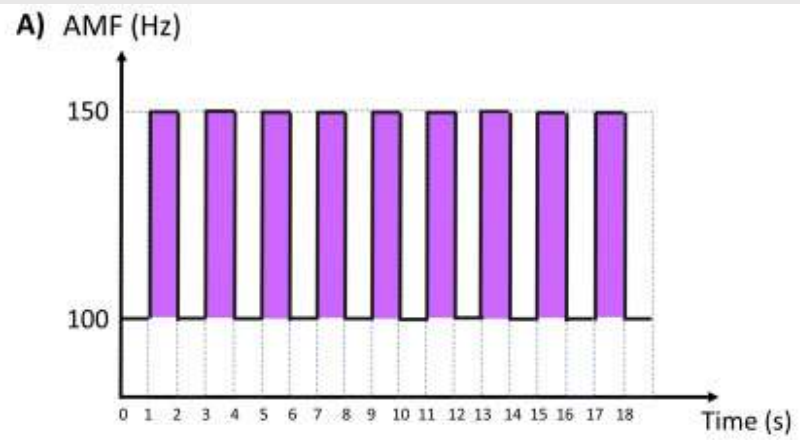
- the oscillation is no longer held fixed for a period of time, it sweeps continuously downwards for six seconds and continuously downwards for six seconds, always having the preset base frequency and the preset sum frequency (that is base frequency + sweep frequency) as its respective peaks and troughs, of the three possibilities.
- This is the mildest most acute and painful complaints

# SWEEP PATTERN

**SWEEP  
LEVEL**

**Base AMF  
level**





# SPECTRUM

The time and the pattern of this modulation is usually adjusted and called as the spectrum

- Advantages of Spectrum:

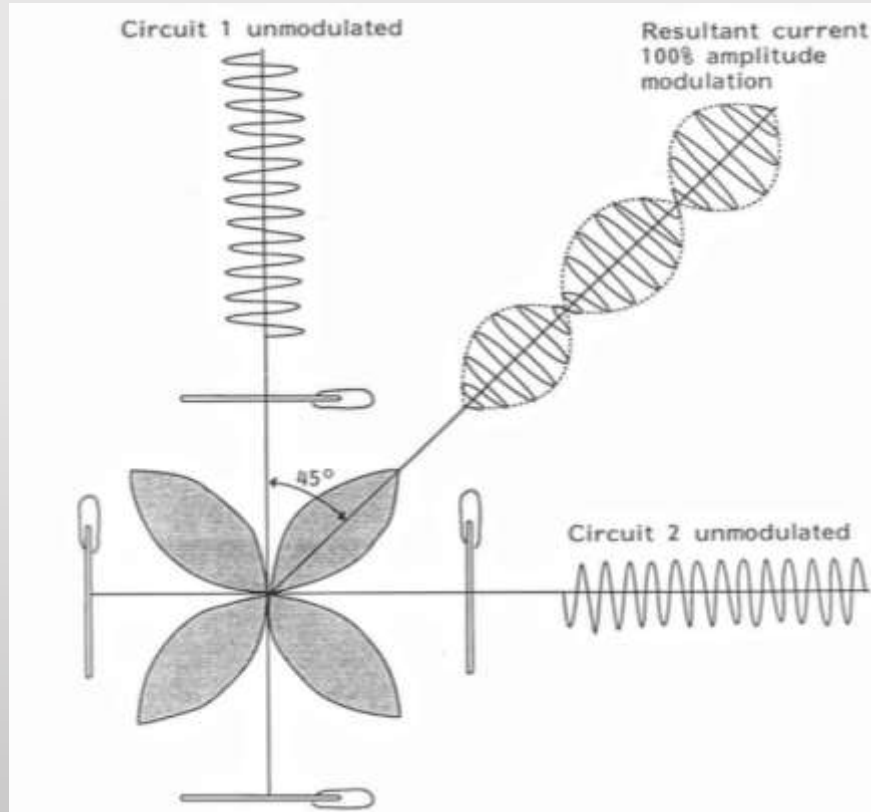
1. Reduce nerve adaptation

2. Allow stimulation of greater range of excitable tissues

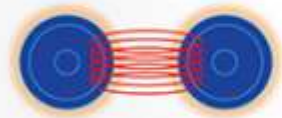


- Variable beat frequency example; -
  - 0 to 5 Hz** stimulates **sympathetic nerves**
  - 5 to 10 Hz** stimulates **parasympathetic nerves**
  - 10 to 50 Hz** stimulates **motor nerves**
  - 50 to 90 Hz** produces **sedative and spasmolytic effect**
  - 90 to 100 Hz** produce **analgesic or pain relief effect**

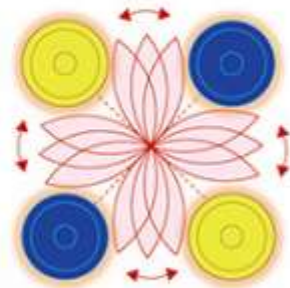
# VECTOR/ SCANNING MODE



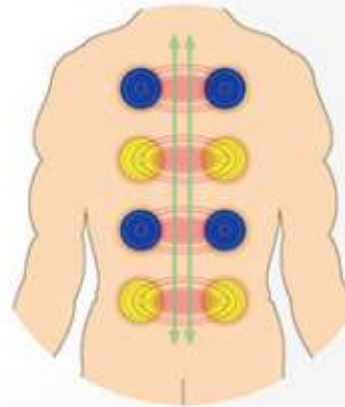
interferential current  
of two electric poles



standard  
interferential current



super  
interferential current



# PHYSIOLOGICAL EFFECT

- Pain relief
- Motor stimulation
- Absorption of exudate

# INDICATION

- Pain relief
- Edema relief
- Stress incontinence

# CONTRAINDICATION

- Hemorrhage
- Skin infection
- Malignancy
- Deep vein thrombosis
- Pacemaker

# DANGERS

- Burn
- Increased pain
- General malaise
- Nausea
- Dizziness
- Migraine

# TESTING OF APPRATUS

- will discuss this into Practical session



# REFERENCE

- Clayton Electro therapy – 3rd & 10th edition
- Electro therapy explained – Low & Reed

**Does anyone have any  
question ???**

# TAKE HOME EXERCISE

- What is the definition of interferential therapy and how does it differ from other forms of electrotherapy?
- Explain the concept of beat frequency in interferential therapy. How is interferential therapy produced using specialized devices, and what are the key components involved in its delivery?
- Draw a labeled diagram of an interferential therapy panel.

**THANK YOU...**