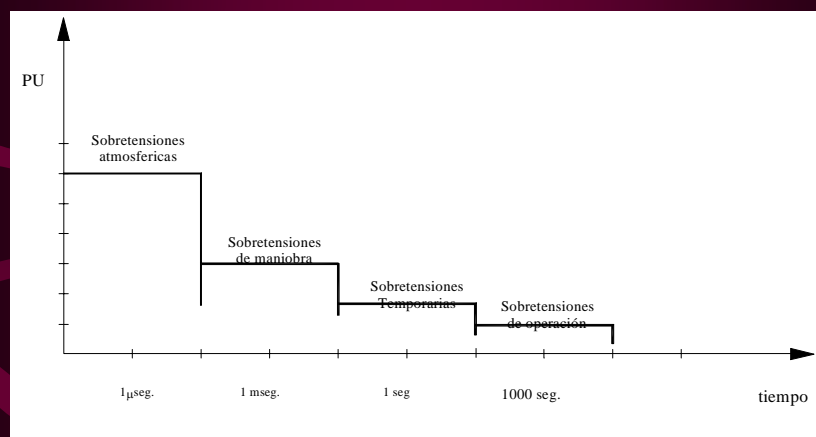


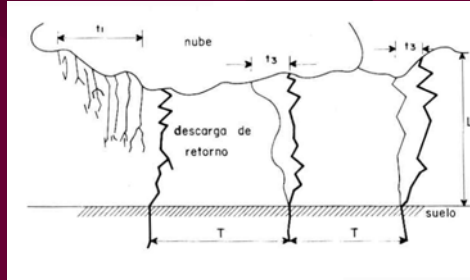
## Sobretensiones generadas en el sistema eléctrico

- Transitoria impulsiva
- Transitoria oscilatoria de maniobras
- Transitoria impulsiva de maniobras
- De corta duración
- De larga duración
- Su transferencia
- Ondas normalizadas

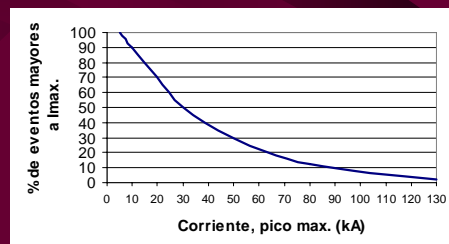
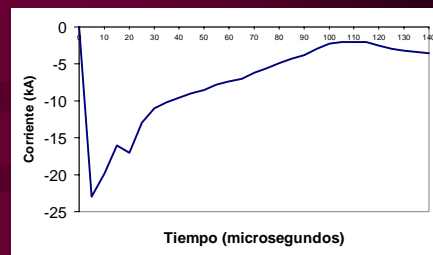
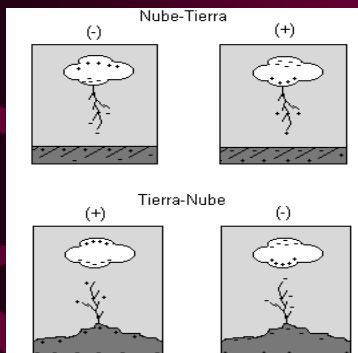
## Sobretensiones en función de su duración



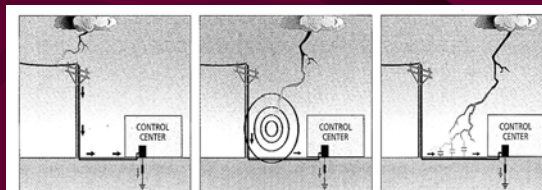
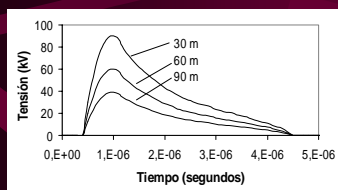
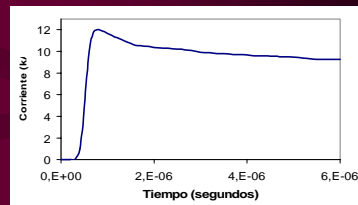
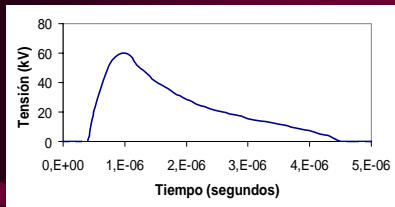
# Sobretensiones Externas



# Descargas atmosféricas

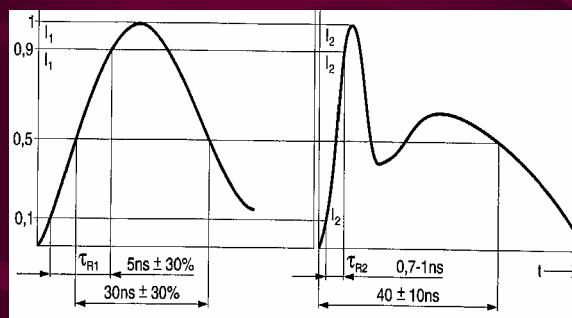


## Tipos de acoplamiento con la descarga

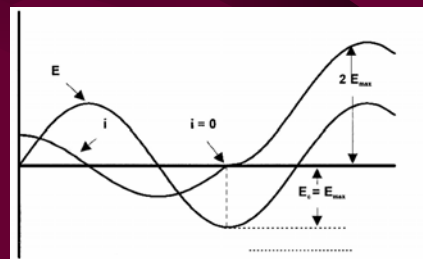
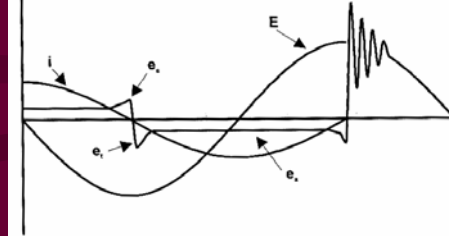
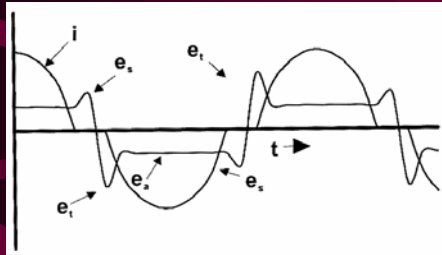


## Descargas Electrostaticas

Nivel	Tensión indicada	Primer pico de la corriente de descarga	Tiempo de elevación $t_r$	Corriente a los 30 ns	Corriente a los 60 ns
	kV	A	ns	A	A
1	2	7,5	0,7 a 1	4	2
2	4	15	0,7 a 1	8	4
3	6	22,5	0,7 a 1	12	6
4	8	30	0,7 a 1	16	8

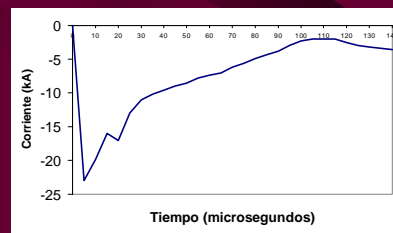
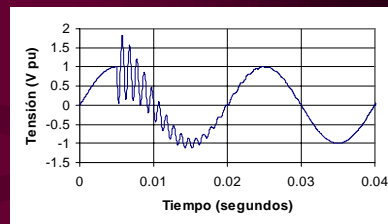


## Operación de interruptores

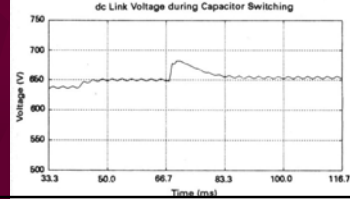
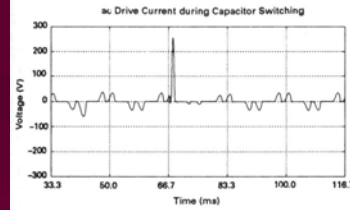
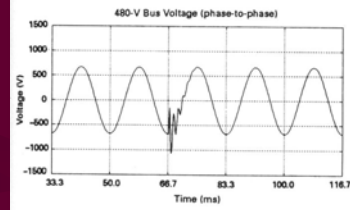
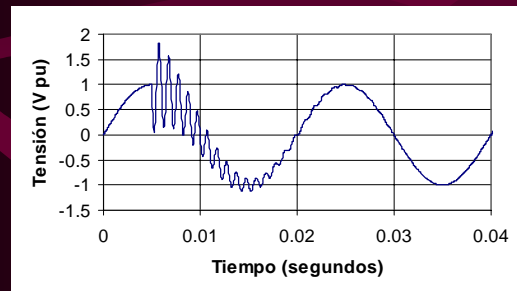
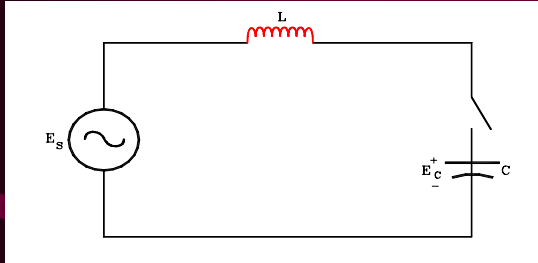


## Sobretensiones Externas

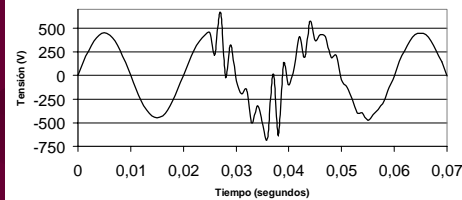
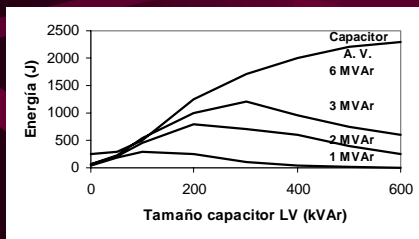
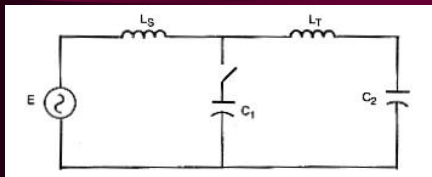
- Principales características:
  - Transitorias de poca duración
- Quién las genera:
  - Descargas atmosféricas
  - Maniobras
  - Conexión de capacitores
- Quién las sufre:
  - Principalmente la micro-electrónica
  - Resulta en daño a equipos
- Su transmisión:
  - Viaja a lo largo de las líneas
  - Pasa a través de transformadores
- Soluciones:
  - Evitar su generación
  - Instalar dispositivos protectores



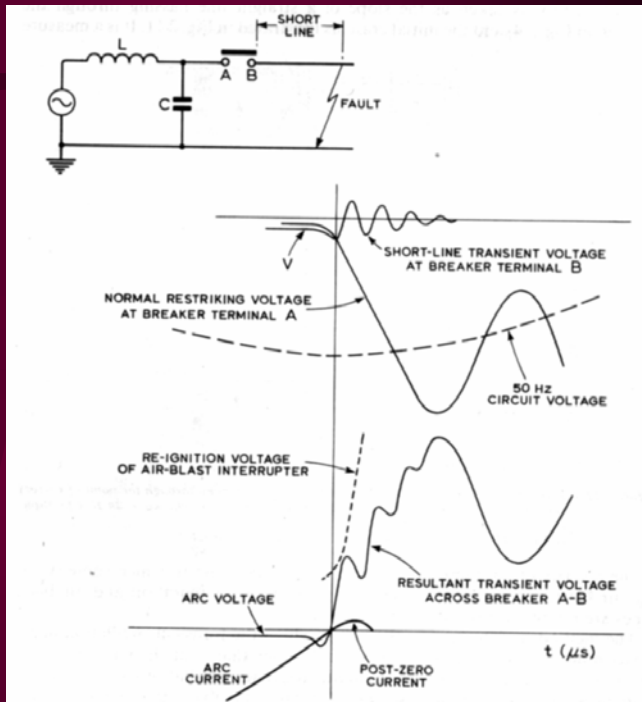
## Conexión de capacitores



## Magnificación capacitiva

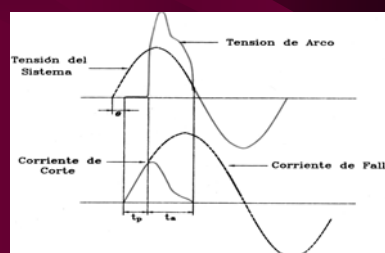
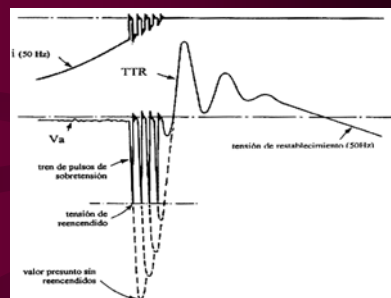


## Falla de línea corta

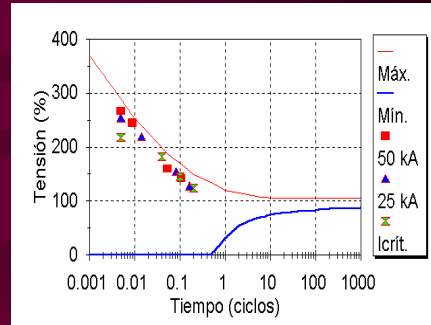
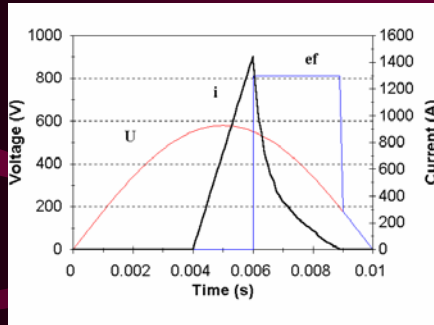


## Sobretensiones Internas I

- Desconexión de carga inductiva empleando interruptores en vacío
- Sobretensiones por actuación de protección limitadora

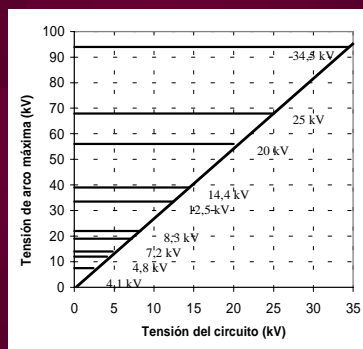
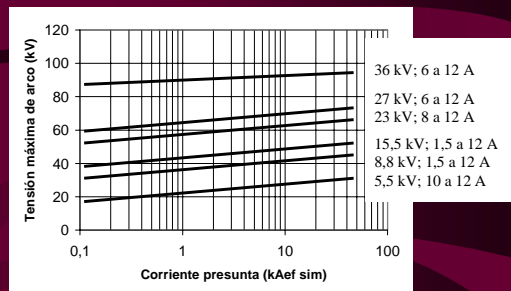


## Sobretensión por interrupción limitadora

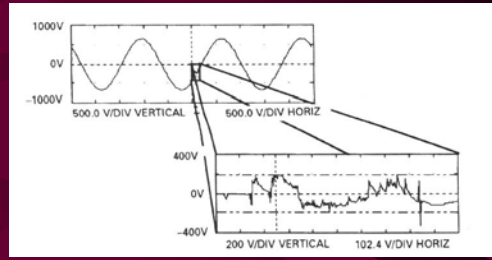
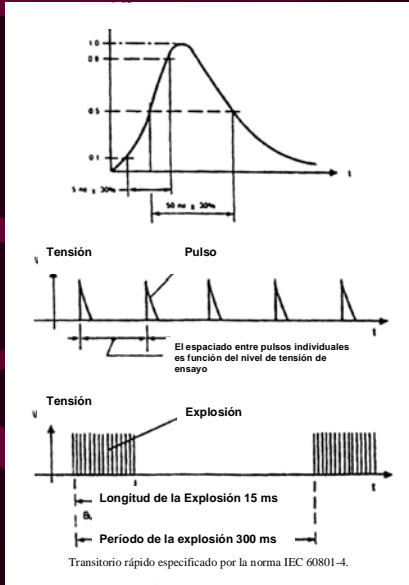


Corriente (kA)	Tensión pico (p.u.)	Tiempo de pico (ciclos)	Tensión promedio en 5% (p.u.)	Tiempo de pico en 5% (ms)	Tensión promedio 50% tp (p.u.)	Tensión promedio (p.u.)	Tiempo de arco (ms)
50	2,67	0,005	2,45	0,18	1,60	1,42	2,16
25	2,55	0,005	2,20	0,288	1,55	1,28	3,33
$I_{critica}$	2,18	0,005	1,82	0,6	1,45	1,24	4,45

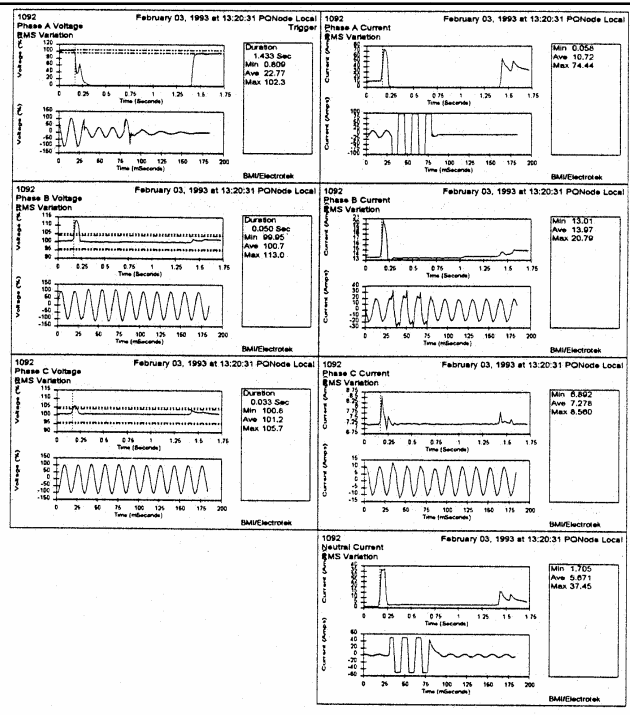
## Sobretensiones generadas por fusibles de media tensión



# Sobretensiones Internas II

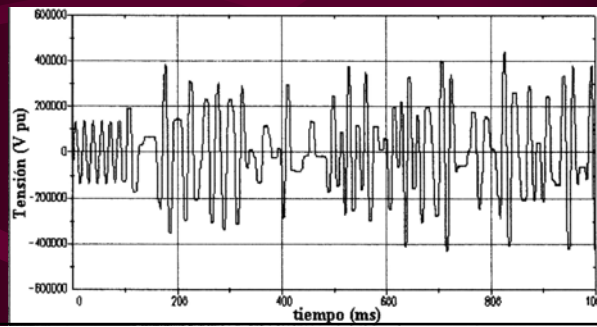
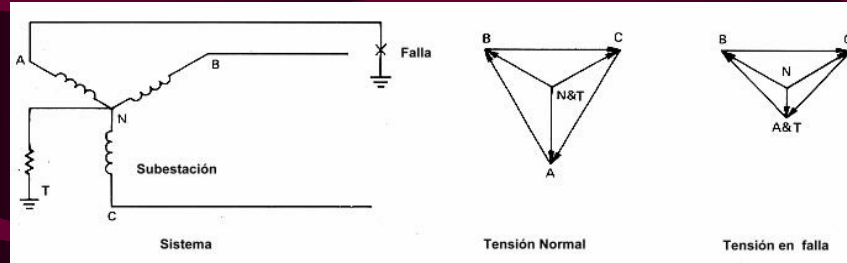


## De corta duración

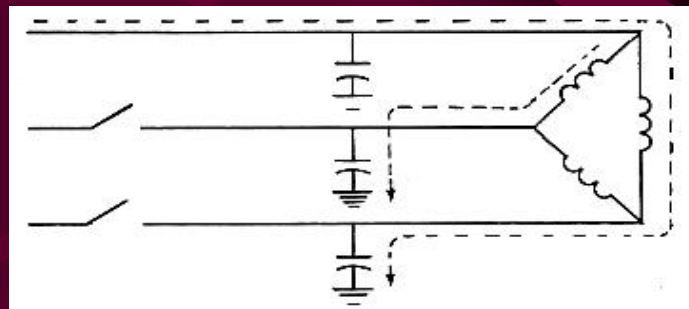
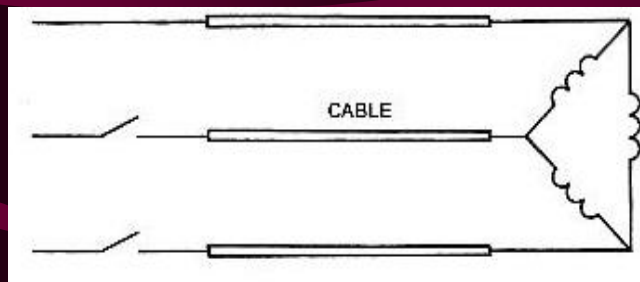




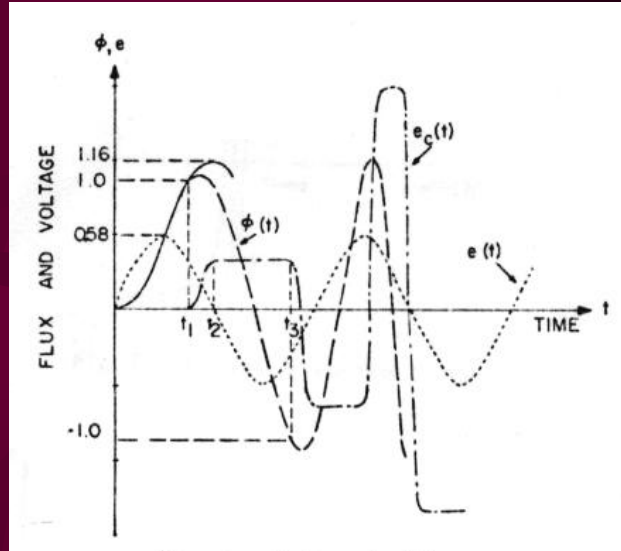
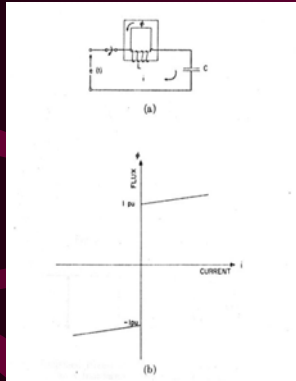
## De larga duración



## Ferroresonancia



## Estudio del fenómeno



## Resultados experimentales

