

Static Power Converters

-Past, Present and Future-

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Abstract: Static power converters and power electronics play significant role in industrial applications, power generation and transmission, home appliance, transportation, etc., etc. Today, power converters are part of our life and everything will be completely different without power converters. How we arrived here where we are now and when static power conversion started? Is it a new discipline or not really? Where we are going in next years and decades? What is future of static power converters?

In the first part of the talk we will briefly go through the history of static power conversion starting from very first “power converters” such as Herz’s Oscillator and Tesla’s Transformer, then very first “Power Devices” such as mercury arc rectifiers, megatrons, thyratrons, and then finally real power devices, SCRs, BJTs, MOSFETs and IGBTs.

In the second part of the talk, influence of static power converters on our everyday life will be addressed. The latest development results in the field of power converters will be discussed too.

The third part of the talk will address future of power converters and some open issues that need urgent solution. We will intensively discuss: New power semiconductor devices such as SiC and GaN, “New” topologies, New material for passive devices (magnetics and capacitors) and System integration including power devices, passives and gate drivers. At the end, converters control aspects, hardware as well as strategies will be briefly addressed.