SEPAC Corp.

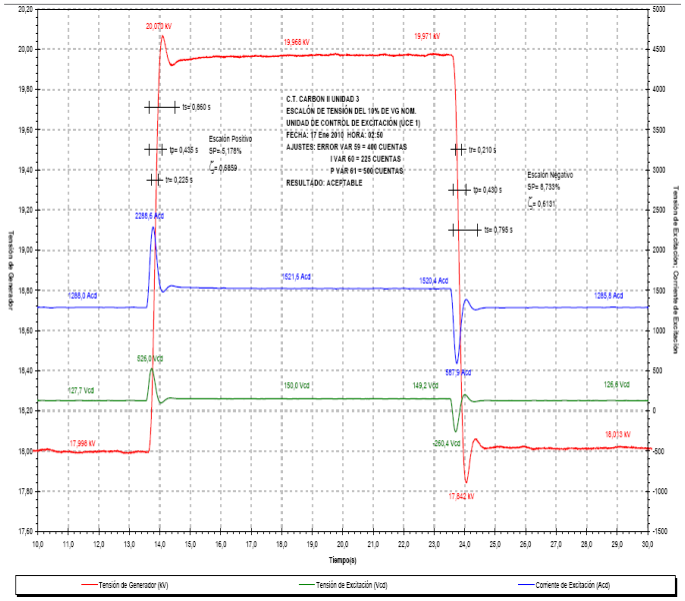
# TRANSFER FUNCTION OF SEPAC EXCITATION SYSTEMS

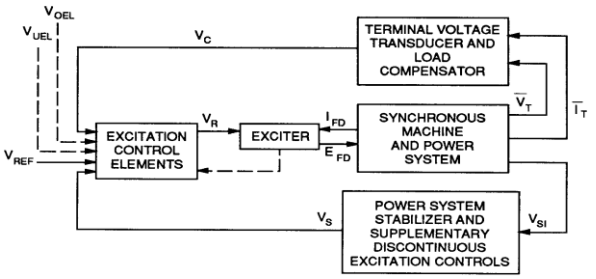
It is well known that the performance of the excitation system can have a great influence on the stability of a power system.

Therefore a correct representation of the dynamics of the excitation system through its transfer function, is of vital importance to the entities responsible of defining mathematical models and performing simulation studies of the interconnected systems.

Such studies help to understand the behavior, predict failures and define operational strategies in order to improve stability and dynamic performance of interconnected networks.

To assist such entities SEPAC has given special attention to the definition of the transfer functions of its excitation systems. These transfer functions are intended to reflect as closely as possible the dynamic responses of SEPAC excitation systems, such as those shown:




## TYPE ST1A /FUNDAMENTAL TRANSFER FUNCTION

**The computer model of the Type ST1A potential-source controlled-rectifier excitation system is intended to represent systems in which excitation power is supplied through a transformer from the generator terminals and is regulated by a controlled rectifier**
**•The maximum exciter voltage available from such systems is directly related to the generator terminal voltage**
**•As a result of the very high forcing capability of these systems, a field current limiter is employed to protect the generator rotor and exciter**

## ST5B /ADMENDMENTS TO STIA

**Type ST5B excitation system is a variation of the Type ST1A model, with alternative inputs for overexcitation / underexcitation limiters**
**•OEL and UEL limiter algorithms and voltage algorithm are switched according to the predominant control-signal**
**• OEL and UEL appear as closed loop systems no longer as limiters or clamps, they have been given individual transfer functions and independent settings, allowing an individual set of parameters for each control-loop**
**•Special attention is given to dynamic response in the overexcitation and subexcitation regimes of the generator.**
**•PSS still confined to settings of preselected control loop, voltage, OEL or UEL**

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## TYPE ST5C / PRIORITY TO PSS

**•The computer model of the Type ST5C is an extension of the current excitation system model ST5B, this extended model offers two alternative possibilities for the application of the PSS stabilizing signal.**
**•Connection either to the AVR error signal or to the regulator output**
**•Possibility of parallel path for the stabilizer signal with PSS-specific lead-lag elements**
**•When connected to regulator output, the PSS allows the optimized performance of the system by overriding all the limiters than could take over the excitation control .**

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