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How About the Role of Circuit Analysis?

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Our Journal of Electrical & Electronics is assuredly focused on both examining the propriety of the existent state of the circuit and system design art and on meaningfully extending the present state of this vibrant discipline. As such, it is hardly surprising that the Journal is obliged to publish original contributions that substantively embrace circuit and system analyses. This operating tack reflects our instincts, be they correct or not, that analysis is the mathematical foundation that supports design.

While our Journal will not elect to counter instinctive arguments, it will promote the philosophy that the fundamental purpose of circuit and system analyses is not the documentation of precise circuit performance or response results. Precise analytical disclosures in the electronics discipline have dubious value since, as any electronics specialist can attest to, active device or circuit branch parameters generally exhibit processing or manufacturing tolerances of at least ±20%. Instead, the pragmatic purpose of analyses is to instill the insightful understanding of circuit and system dynamics that can forge creative, innovative, and efficient network design strategies. Such insights can derive from approximate mathematical endeavors as long as the sources and impact of the invoked approximations are clearly articulated. If a paper is to posture itself as "design-oriented," the insights it conveys must include a delineation of design attributes, design shortfalls, mitigation suggestions for such shortfalls, and reasonable design tradeoffs, particularly when the collective attributes exceed targeted expectations.

Implicit to documenting design insights is the awareness that manual analyses are merely the precursor to definitive computer-aided investigations. The salient feature of these circuit and/or system simulations is a foundational component to design orientation. And good news can actually accrue when the fruits of a computer-aided study do not mirror the implications of analyses executed manually.

The "good news" might assume the simple form of an honest mistake or inadvertent omission of a critical variable. Or it might be profound in that it may suggest an impropriety to an adopted presumption or an invoked analytical technique. A complete disclosure of the latter case evolves a true learning experience from which the focused and interested reader can profit. In my own case, I humbly assert to my students that I have profited far more from the myriad of my errors than from the few successes with which I am credited.

As noted earlier, our Journal will examine and extend the extant state of the start. But in addition, it will comprise an educational archive that can foster enhanced circuit and system design expertise.

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