It is suggested that research be directed toward the development of electromagnetic models whose parameters describe both local and global object features of definitive classes of scattering objects. Consideration of such parameters as the physical optics reflection coefficient and radius of curvature is clearly indicated. Without these early time features, a satisfactory parametric inverse method remains elusive.

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## Response to Comments Regarding SEM Representations

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The comments by Felsen [1] and Dudley [2] both address the "formal" nature of the SEM representations for scattering, as recently derived by Pearson [3] and Morgan [4]. These papers [3], [4] develop mathematical justifications for explicit, although formal, singularity expansion representations for scattered impulse response fields, both in the time and frequency domains. In addition to detailed insights into the scattering process, these efforts provide original clarifications of a long-standing, and controversial, question regarding the absolute need of an entire function in the SEM scattering representation.

As was emphasized in [4], the quest for a "proper" signal model for natural resonance pole extraction processing provided the motivation for that study. The key phrase here is "natural resonance," not imaging or parameterization of physical dimensions. In work that is in progress, the early-time driven response ($s$-plane entire-function) is being further dissected, revealing physical topology and dimensional parameters as well as eigenmodes having evolving spatial support.

The class 2 SEM form, having time-varying coefficients in the early time, is regarded in [1] and [2] as formally legitimate but otherwise unacceptably artificial and disjoint from any physical interpretation. In the context of direct application to system identification this viewpoint may, in fact, be correct. On the other hand, the class 2 form may provide a viable alternative representation for further "formal" mathematical investigations, perhaps resulting in enhanced understanding and advanced applications.

One last minor point concerns the statement in [1] that the excitation of a smooth convex conducting object beyond the shadow bounday is through the "creeping wavefront" and *not* by way of the incident wavefront. The magnetic field integral equation, as employed in [4], incorporates an "extended" physical optics current as the externally supplied excitation. This current progresses with the incident wavefront over the entire surface, continuing *beyond* the shadow boundary. It is this incident excitation that determines the SEM coupling coefficients. The disagreement here apparently stems from differences of terminology and physical model. While the object is still being illuminated, the creeping wave is composed of both the extended physical optics current and the progressive current "wake" produced by the previously illuminated surface region. Thus, the *total* excitation of points in the shadow region may be *defined* to be by way of the creeping wave. This same concept may be extended to the illuminated side as well.

In conclusion, there appears to be various equivalent conceptual interpretations associated with the SEM. The ongoing saga of "controversy" in this subject results as much from this diversity of ideas as it does from "fuzzy terminology."

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## Correction to "Natural Radio Noise—A Mini-Review"

WARREN L. FLOCK, SENIOR MEMBER, IEEE, AND ERNEST K. SMITH, FELLOW, IEEE

In the last line of the above paper,[1] the report number should be 342-4. The line should read "below 50 MHz is treated in CCIR Report 342-4 [38]." The following reference is also needed.

[38] CCIR, "Radio noise within and above the ionosphere," *Propagation in Ionized Media, Recommendations and Reports of the CCIR, 1982,* Rep. 342-4, vol. VI, Geneva: Int. Telecomm. Union, 1982.

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