For clarity, in response to Dr. Leishman's statement *"I already conceded ground under pressure from the editor-in-chief as a condition for my Comment to be accepted for review in the first place."*, we report here the correspondence with the Author after the submission of his first manuscript.

Carlo L. Bottasso, Editor in Chief

Carlo L. Bottasso

From:	Carlo L. Bottasso
Sent:	Wednesday, July 16, 2025 9:24 AM
To:	Leishman, J. Gordon
Cc:	Veers, Paul; Jakob Mann; Sandrine AUBRUN; Fleming, Paul; Nicolaos Antonio Cutululis; Gottschall, Julia; Athanasios Kolios
Subject:	Comment on the Tyagi and Schmitz paper
Attachments:	TyagiSchmitz_comment_by_Leishman w_markup.pdf

Dear Prof. Leishman,

The Chief Editors have reviewed and discussed your Comment on the Tyagi and Schmitz paper.

The Editors are very pleased that you have taken the time to write a very thoughtful and penetrating assessment of this work. Your submission makes use of the "peer-reviewed comment to a published paper", an option that -until now- has been underutilized in our journal. We are eager to move forward, though this does take us into somewhat new territory. So, we kindly ask you to be patient as we feel our way forward.

The next step will be to invite peer reviews of your Comment, which we expect will broaden the dialogue significantly. The issues you raise are important and should stimulate a conversation within the community, which is precisely the intent of the open-comment feature of Wind Energy Science.

To launch this relatively new process and encourage responses from reviewers that keep the dialogue productive, the Chief Editors unanimously recommend that your submission be modestly revised before review. There is an opportunity at this early phase to set a tone that avoids sending this potentially constructive dialogue down a path that might be more contentious than it needs to be.

A slight re-wording might help in a few instances. Such comments as *"apparent… rigor"*, *"vague commentary"*, or *"an air of… sophistication"* can cause reviewers to get distracted from the substance of the issues, and tend to make authors defensive rather than accepting of well-deserved criticism. Repeatedly addressing *"these authors"* rather than the content makes the criticism seem personal.

The journal's decision to accept a previously published concept as a new article is indeed fair to question. Our plagiarism detection software did not flag the article due to an extensive restructuring and rewording with respect to the previous conference paper. That said, we will tighten up our processes in response to this situation. In particular, we will publish an editorial comment, and we will improve the wording in our author instructions to help prevent similar issues in the future.

However, we feel that explicitly suggesting the authors are guilty of *"serious ethical concerns"* may not be helpful after pointing out the obvious duplication. We try to be generous in our assumptions of intent, and believe that a less defensive dialogue is more likely if such conclusions are left to the reader. (A copy of your submission is attached with a few highlighted phrases that might be reconsidered.)

The Chief Editors are unanimous in welcoming your contribution and are eager to get the reviews started. We look forward to a constructive dialogue – all thanks to your hard work and generous contribution of time and effort to clarify the public record.

We hope our recommendations for slight re-wording are taken as the purely constructive spirit they are intended.

We look forward to your early response.

Carlo L. Bottasso, Editor-in-Chief

Comment on: "Tyagi, D. and Schmitz, S., "Glauert's optimum rotor disk revisited – a calculus of variations solution and exact integrals for thrust and bending moment coefficients," Wind Energ. Sci., 10, 451–460, https://doi.org/10.5194/wes-10-451-2025, 2025."

by

J. Gordon Leishman, Ph.D., D.Sc.(Eng.), F.R.Ae.S.
Professor Emeritus, Dept. of Aerospace Engineering, University of Maryland.
Distinguished Professor, Dept. of Aerospace Engineering, Embry-Riddle Aeronautical University.

This paper (Ref. 1) revisits the momentum theory problem for a windmill (i.e., a wind turbine) with apparent mathematical rigor and pedagogical eloquence. Still, it ultimately offers nothing of substance to the wind energy field. Recasting Glauert's "optimum rotor" formulation using the calculus of variations and L'Hôpital's rule may suggest an air of analytical sophistication, yet it is little more than formalist repackaging that obscures rather than clarifies the underlying physical principles. These authors introduce no new physical insights; instead, they layer well-understood concepts in abstraction and vague commentary, disconnected from engineering reality. Although mathematically elaborate, their derivation of "exact" integrals for thrust and bending moment coefficients lacks practical relevance and fails to advance the field of rotor theory or wind turbine engineering.

These authors first examine the condition where the tip speed ratio $\lambda \to \infty$, and then find the power coefficient C_P and the bending moment coefficient C_{Be}. Physically, this corresponds to a scenario where the rotor is spinning much faster than the incoming wind speed, such that tip speed effects dominate over the relative inflow. In this regime, the axial velocity becomes negligible, and the flow approaches a purely tangential direction at the blade elements. These authors incorporate swirl into their equations through the angular induction factor; however, in the high-λ limit, they assume $a' \to 0$, implying that the turbine imparts no swirl and, consequently, no torque. This issue introduces a fundamental contradiction in their theory, i.e., a turbine cannot extract power without torque. While the integrals they have derived may be mathematically consistent, they apply to a physically unrealizable situation. These authors neither resolve this mathematical inconsistency nor acknowledge this physical reality, which critically undermines the credibility of their high-λ results. However, and more importantly, no manufacturer designs wind turbines for high λ operation, and no turbine operates in this regime. Indeed, under these conditions, the turbine blades would require physically impossible twist and chord distributions.

In the low tip speed ratio limit ($\lambda \to 0$), these authors next derive exact integrals for C_P, C_T, and C_{Be} using repeated applications of L'Hôpital's rule to resolve singularities. While these derivations may be formally correct, the physical context is again fundamentally flawed. In this regime, the turbine is either stationary, operating with blade stall, or in a transient startup phase, conditions under which no meaningful power is extracted, and the aerodynamic loads are dominated by separated and unsteady flow. In effect, the turbine behaves more like a parachute than a turbine; it operates in the turbulent wake state, which means that it obstructs the flow rather than extracting energy from it, thereby completely violating the flow model these authors have assumed. Under these conditions, the flow field is highly three-dimensional, non-uniform, and often dominated by large blade section angles of attack, rendering the momentum theory assumptions of steady, axisymmetric, and uniform flow with a constant pressure jump entirely inapplicable. Moreover, from a practical standpoint, modern turbines are designed to avoid operation in this regime altogether, typically idling or feathering at low wind speeds. The analytical effort invested by these authors in characterizing this physically irrelevant limit provides no guidance for turbine design, control strategy, or performance optimization, and reflects an unprecedented level of academic detachment from practical engineering reality.

Using the calculus of variations to rederive Glauert's third-order polynomial equation offers a modest pedagogical novelty. The expressions for C_T and C_{Be} may be formally "new" in closed form, but they are derived under conditions so idealized as to be irrelevant to any form of practical wind turbine engineering. Furthermore, the paper fails to even acknowledge the real possibility of tip losses, finite blade count, profile drag, wake expansion, or non-uniform and yawed inflow. These are factors far more worthy of theoretical attention in wind engineering than the perception by these authors of a "100-year-old math problem" (Ref. 2). Indeed, in Glauert's original theory, the limiting behavior was never considered a theoretical or mathematical problem at all, nor was it subsequently considered a problem within wind energy research, either theoretically or practically. Their so-called "math problem," therefore, is only one of their own invention.

Additional issues arise in the presentation of their results. Several equations (e.g., Eqs. 35, 48, and 50) include numerical constants such as 2.5457 and -13.3272 without explanation or derivation. While not strictly erroneous, this practice undermines the rigor and transparency of their work. Providing explanations or citing how these constants were computed would have improved the clarity and independent reproducibility of their results. Without clearly stated methods or symbolic groundwork, the derivations appear procedural rather than intellectually motivated, further weakening the credibility of their results and their relevance. Indeed, despite the apparent technical competence of the derivations, their work remains disconnected from the practical challenges and standards of modern wind turbine research. There is no comparison to empirical data, computational results, or reconciliation with other findings. Their model assumes a wind turbine with an infinite number of blades that have a continuously optimal span loading at any λ. This is a mathematical abstraction that has no place in any realistic wind turbine analysis, particularly in the high- and low-λ regimes that these authors specifically emphasize.

While their mathematical work appears internally consistent within the constraints of an idealized model, the model's assumptions physically break down in precisely those regions where their work attempts to provide insight. These authors do not extend Glauert's theory in a way that adds engineering value or new physical understanding. While the work may be of limited academic interest to those studying the historical development of rotor theory, it certainly falls short of the novelty, applicability, and physical relevance expected of contributions to *Wind Energy Science*. Instead, by clinging to an idealized and largely irrelevant theoretical framework, these authors ultimately misrepresent the spirit of Glauert's original contributions to the theory of rotors and wind turbines. Their work most certainly does not "unlock new possibilities in wind turbine design that Hermann Glauert did not consider" (Ref. 2). It is a sad reflection on the current state of academic publishing that such claims could be legitimized and even tacitly endorsed within the pages of an apparently reputable journal.

Finally, it is important to note that the central derivations, coefficient expressions, and conclusions of this article closely match those previously published by the same authors in a publicly accessible conference paper (Ref. 3). That earlier published work contains essentially the same analytical development, including the polynomial forms, integration techniques, convergence analysis, and variational formulation. This 2025 *Wind Energy Science* article does not cite or acknowledge the prior conference version, which raises a major omission that warrants further editorial attention. Of greater concern is that both papers contain substantial verbatim and near-verbatim reuse of text, structure, and phrasing. The core mathematical derivations are essentially the same, and the conclusions are restated with only minor editorial variation. This unacknowledged repetition constitutes self-plagiarism under standard publication ethics, as it recycles previously published material without appropriate citation or disclosure. While this journal article appears more refined on the surface, the failure to cite a substantially overlapping publication, particularly one with a DOI and broad public accessibility, raises serious ethical concerns about proper attribution and transparency in the communication of research findings.

References

1. Tyagi, D., and Schmitz, S., "Glauert's optimum rotor disk revisited – a calculus of variations solution and exact integrals for thrust and bending moment coefficients," Wind Energ. Sci., 10, pp. 451–460, available at https://doi.org/10.5194/wes-10-451-2025, 2025.

2. Kevin Sliman, "Student refines 100-year-old math problem, expanding wind energy possibilities, Penn State News, Feb. 21, 2025, available at https://news.engr.psu.edu/2025/schmitz-sven-wind-energy-math-problem.aspx

3. Tyagi, D., and Schmitz, S., "Amendment to Glauert's Optimum Rotor Disk Solution," AIAA Conference Publication, DOI: 10.2514/6.2024-84552, available at https://arc.aiaa.org/doi/pdf/10.2514/6.2024-84552.