

# Technical Comment

## Comment on “Analytic Solution of the Riccati Equation for the Homing Missile Linear-Quadratic Control Problem”

Ilan Rusnak\*

RAFAEL, Ministry of Defense, Haifa 31021, Israel

**I**N Ref. 1 it is claimed that “the major contribution of this Note lies in the analytic solution of the matrix Riccati differential equation.”

Here we point out that this claim is not fully true. The only new result is a different derivation of the solution but not the solution itself. The solution in Ref. 1 is just a special case of the solution presented, without the single-input–single-output (SISO) assumption,

in Ref. 2. The result for homing systems is again a special case of Refs. 3–5 where besides the explicit solution, an interpretation that provides insight into the structure of the solution for arbitrary order missile and target models is presented.

### References

- <sup>1</sup>Lovren, N., and Tomic, M., “Analytic Solution of the Riccati Equation for the Homing Missile Linear-Quadratic Control Problem,” *Journal of Guidance, Control, and Dynamics*, Vol. 17, No. 3, 1994, pp. 619–621.
- <sup>2</sup>Rusnak, I., “Almost Analytic Representation for the Solution of the Differential Matrix Riccati Equation,” *IEEE Transactions on Automatic Control*, Vol. AC-23, Feb. 1988, pp. 191–193.
- <sup>3</sup>Rusnak, I., and Meir, L., “Optimal Guidance for Acceleration Constrained Missile and Maneuvering Target,” *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 26, AES-26, No. 4, 1990.
- <sup>4</sup>Rusnak, I., and Meir, L., “Modern Guidance Law for High Order Autopilot,” *Journal of Guidance, Control, and Dynamics*, Vol. 14, No. 5, 1991, pp. 1056–1058.
- <sup>5</sup>Rusnak, I., and Meir, L., “Optimal Guidance for High Order and Acceleration Constrained Missile,” *Journal of Guidance, Control, and Dynamics*, Vol. 14, No. 3, 1991, pp. 589–596.