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### RESEARCH NOTE ON A PARABOLIC HEAT-BALANCE INTEGRAL METHOD WITH UNSPECIFIED EXPONENT: AN ENTROPY GENERATION APPROACH IN OPTIMAL PROFILE DETERMINATION

#### ABSTRACT

The heat-balance integral method of Goodman is studied with two simple 1-D heat conduction problems with prescribed temperature and flux boundary conditions. These classical problems with well known exact solutions enable to demonstrate the heat-balance integral method performance by a parabolic profile and the entropy generation minimization concept in definition of the appropriate profile exponent. The basic assumption generating the additional constraints needed to perform the solution is based on the requirement to minimize the difference in the local thermal entropy generation rates calculated by the approximate and the exact profile, respectively. This concept is easily applicable since the general concept has simple implementation of the condition requiring the thermal entropy generations calculated through both profiles to be the same at the boundary. The entropy minimization generation approach automatically generates the additional requirement which is deficient in the set of conditions defined by the heat-balance integral method concept.

#### KEYWORDS

[heat-balance integral method](#), [parabolic profile](#), [unspecified exponent](#), [entropy generation](#), [entropy minimization method](#)

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