where $\partial A/\partial x = 0$ at the nozzle throat, thus yielding King's choking criterion if both $\partial\rho/\partial x$ and $\partial V_a/\partial x$ are finite at the throat section.

However, the variation of both ρ and V_a in the axial (x) direction at the nozzle throat can be reduced to zero with a well-rounded approach section, and this is the assumption made in the author's analysis, thus satisfying criterion (4).

With $\partial P/\partial x = \partial P/\partial\theta = 0$ at the nozzle throat, Eq. (3) is transformed to a total differential equation, with the solution given by the author's Eq. (10) if it is assumed that $r_*/r_0 = R_*/R_0$. The validity of this assumption is open to question, but hopefully it should suffice for a first approximation.

It can be shown that King's Eq. (10) will result in a radial pressure gradient given by

$$(1/\rho)(\partial P/\partial r) = -[2/(\gamma + 1)](V_t^2/r)$$

which fails to fulfill the requirements of Eq. (3) in both magnitude and direction.

Thus, the author's results are found to be compatible with each of the governing criteria, Eqs. (1–4), whereas King's results fail to satisfy the radial momentum balance required by Eq. (3) and must therefore be considered invalid.

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Comment on Probe Payload Selection

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DETERMINATION of the scientific payload of a Mars probe (or any other probe) involves choosing one of the many possible combinations of instruments that do not exceed specific weight, power, and required bandwidth constraints. A decision problem of this nature is typically formulated in the following manner[1]: 1) List the possible actions, $A_1 \ldots A_n$ (in this case the possible combinations of instruments); 2) List the alternative possible environments to be encountered, $E_1 \ldots E_m$; and 3) Assign a utility U_{ij} to the outcome of having chosen act A_i if environment E_j occurs for all combinations of A and E. (The U_{ij}s are "cardinal" utilities, unique up to a linear transformation, and usually normalized to the interval between zero and one.) Decision theory attempts to provide rules for choosing an optimum action in the face of uncertainty. The basic point is that the expected utility of each set of instruments can depend critically on the environment encountered. Hence, the relative likelihoods of the alternative environments can strongly affect the choice of instruments. It is somewhat surprising, therefore, to find that in recent studies of Voyager payload selection by Fosdick and Morgenthaler,[2] Dyer,[3] and Puette,[4] *there is no mention of the effect that uncertainty in the enviornment would have on instrument selection.*

The conclusion these authors draws from the foregoing is threefold: 1) Previous "objective" payload optimizations are at best misleading since they fail to consider uncertainty in the environment to be encountered. 2) Quantitative payload optimization is currently impossible since there exist no techniques for maximizing expected utility when the probability distribution over possible states of nature is not precisely known.[5] But, 3) even if quantitative payload optimization is impossible, explicit consideration of alternative environments, as well as alternative payloads, can sharpen our thinking about decisions that will remain for some time a matter for qualitative judgement.

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Erratum: "Effects of Atmospheric Drag on the Position of Satellites in Eccentric Orbits"

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IN this paper, Eq. (49) should read

$$P(2\pi n + \alpha, \epsilon) = 2\pi^2 n^2 I_0(\epsilon) + P(\alpha, \epsilon) + 2\pi n L(\alpha, \epsilon)$$

In Eq. (36), the symbol ψ_0 should be ϕ_0 so that the equation reads

$$\Delta u = D\{L(\psi) - L(\phi_0) - \cos\psi[M(\psi) - M(\phi_0)] - \sin\psi[N(\psi) - N(\phi_0)]\}$$

The authors also would like to take this opportunity to point out the physical significance of the right-hand side of the latter equation: the expression $L(\psi) - L(\phi_0)$ represents the decay of semimajor axis; the term $\cos\psi[M(\psi) - M(\phi_0)]$ represents the difference between apogee decay and perigee decay; and the term $\sin\psi[N(\psi) - N(\phi_0)]$ represents the short-periodic rotation of the line of apsides.

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