similar to that used by Punga. Using the Nomenclature of Punga, the following velocities can be written:

$$\left.\begin{aligned} \frac{d\mathbf{R}^{(G)}}{dt} &= \frac{d\mathbf{R}^{(0)}}{dt} + \omega \times \mathbf{r}^{(G)} + \frac{\delta \mathbf{r}^{(G)}}{\delta t} \\ \frac{d\mathbf{R}_N}{dt} &= \frac{d\mathbf{R}^{(0)}}{dt} + \omega \times \mathbf{r}_N + \frac{\delta \mathbf{r}_N}{\delta t} \\ \mathbf{v}_e &= \frac{d\mathbf{R}^{(0)}}{dt} + \omega \times \mathbf{r}_N + \mathbf{v}_e^{(0)} \end{aligned}\right\} \quad (7)$$

where $\mathbf{v}_e^{(0)}$ is the velocity of the escaping gases relative to the reference systems fixed in the body. Using these relations, Eq. (6) will reduce to

$$\bar{F} = M\frac{d\mathbf{V}^*}{dt} - \frac{d^2M}{dt^2}(\mathbf{r}_N - \mathbf{r}^{(G)}) - \frac{dM}{dt}\left\{\mathbf{v}_e^{(0)} + \frac{\delta \mathbf{r}_N}{\delta t} - 2\frac{\delta \mathbf{r}^{(G)}}{\delta t} - 2\,\omega \times (\mathbf{r}_N - \mathbf{r}^{(G)})\right\} \quad (8)$$

The last two terms of Eq. (8) are usually labeled as the reactive force since they are functions of mass ejection. Now if we call the reactive force **K**, then Eq. (8) reduces to

$$\mathbf{F} + \mathbf{K} = M(d\mathbf{V}^*/dt) \quad (9)$$

which is the usual form of the rocket equation. Examining Eq. (8), the motion of the center of mass cannot be separated from the reactive force.

There are a few printing errors that crept into Punga's paper, which do not affect the final equation derived.

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Spectroscopic Constants for the N^+ Ion

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THE purpose of this note is to point out an error in Ref. 1. Stupochenko, et al., in their Table 1, list incorrect spectroscopic data for the ion N^+. The authors cite Ref. 2 as the source of their data, and their error stems from the fact that they transcribed Moore's data for N^{++} (NIII) rather than that for N^+ (NII).

The data in Table 1, from Ref. 2, should be substituted for that in Ref. 1. As an example of the magnitude of error involved in using Ref. 1 rather than Ref. 2, we compute the partition function of N^+ at several temperatures (see Table 2).

$$Q_{N^+} = \sum_i g_i\, e^{-\epsilon_i/kT}$$

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Table 1 Energy levels for N^+ ion

$\epsilon_p(\text{cm}^{-1})$	g_p
0	1
49.1	3
131.3	5
15315.7	5
32687.1	1
47167.7	5
92237.9	7
92251.3	5
92252.9	3

Table 2 N^+ partition function

	Q_{N^+}	
$T(°K)$	Ref. 1	Ref. 2
1,000	5.11	7.94
6,000	5.84	8.93
12,000	5.92	9.72

References

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Viscous Flow Properties on Slender Cones

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Nomenclature

M = Mach number
P = static pressure
Re = Reynolds number
T = temperature
U = velocity
β = $(M_1^2 - 1)^{0.5}$
δ^* = boundary-layer displacement thickness
γ = ratio of specific heats
θ = semivertex angle
σ = Prandtl number

Subscripts

1 = freestream conditions
2 = condition at outer edge of boundary layer
c = inviscid conical flow value
w = wall
x = distance from vertex along cone surface

THE use of a similarity parameter has been employed by several authors to predict the inviscid flow properties for supersonic and hypersonic flow over cones. Linnell and

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