Besides stating that comparing his equations agree with to Sharp's, Weir refers to Whipple [1899], Pearsall [1922], Döhring [1955], Singh [1964], Singh and Goel [1971], but does not compare his equations to these **works.**

Singh and Goel, 1975

In 1975 Singh and Goel presented (but did not derive) a 12th order mathematical model, for the continued analysis of the Rajdoot scooter. Instead of using Singh's [1964] equations, or Dohring [1955] equations as they did in 1971, they employ a Lagrangian formulation which appears similar to Sharp's [1971] format. The authors claim that the model used is a fully general Basic bicycle model, having in addition unsymmetric lateral mass distribution, lateral slip, aerodynamic forces, viscous damping of the steering, and transient tire forces and moments (which account for the high order of the system).

The four equations of motion presented are said to represent the lateral motion, yaw, lean, and steer equations of motion. We have not yet checked these equations for correctness, but they do appear similar to Sharp's [1971] four equations. Singh and Goel refer to their 1971 paper on the Rajdoot scooter, and to Sharp's [1971] paper, but do not compare their equations.

Sharp and Jones, 1975

In 1975 Sharp and Jones use the equations derived by Sharp [1971] and modify it to incorporate a different tire model. **As** in the 1971 paper the principal axes of

inertia are assumed to be parallel and perpendicular to the steering axis equations of motion. Other than this, these equations are equivalent to those in Sharp's 1971 paper, which when simplified correctly formed **a** subset of the equations presented in Chapter III of this thesis.

Weir and Zellner, 1978

Weir and Zellner later published the results of Weir's dissertation derivation in Motorcycle Dynamics and Rider Control (SP-428, 1978), but mistakenly thinking Weir's earlier derivation was wrong, they deleted a necessary term without comment. The term needing correction can be found on page 8 in the matrix equation (1), where the second row fourth column terms of the matrix should read,

$$\frac{L_{\ddot{\delta}}}{I_{xx}}s^2 + L_{\dot{\delta}}s + L_{\delta}$$

There are also some typos in equation (1) and we note the third row fourth column term should read,

$$N_{\ddot{\delta}}s^2 + N_{\dot{\delta}}s + N_{\delta}$$

and finally the fourth row fourth column term should read,

$$T_{\ddot{\delta}}s^2 + T_{\dot{\delta}}s + T_{\delta}$$

Because of these typographical errors we recommend using Weir's dissertation for any comparison of equations or results.

Incidentally, when corrected Weir and Zellner's matrix can be written to be symmetric **except** for the antisymmetric gyroscopic terms, but his notation does not make this evident.