

## Part IV

# MULTIBODY DYNAMICS TOOLS FOR STRUCTURAL AND BIOMECHANICS CRASHWORTHINESS

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## NOTATION

<b>a, b,</b>	Column vectors (boldface lower-case characters)
<b>A, B,</b>	Matrices (boldface upper-case characters)
<b>(...)'</b>	Components of (...) in body-fixed coordinates
<b>(...)</b>	Components of (...) in inertial frame coordinates
<b><math>\lambda</math></b>	Vector of Lagrange multipliers
<b><math>\xi\eta\zeta_i</math></b>	Body-fixed Cartesian coordinate system
<b><math>\Phi</math></b>	Vector of kinematic constraints
<b>D</b>	Jacobian matrix of constraints
<b>q</b>	Vector of Cartesian coordinates