B747LatValues produces structures containing values from the book

B747LatValues takes the lateral non-dimensional and dimensional derivatives from the book (pg. 187, 188) and puts them into structures.

```
function [] = B747LatValues()
```

Declare globals, constants, and conversions

```
global Constants Conv nDLatDer E1

Constants.g = 9.81; % [m/s^2]
% Constants.XDe = -3.818*10^-6; % non-dimensional elevator derivative for X
% Constants.ZDe = -0.3648; % Non-dimensional elevator derivatice for Z
% Constants.MDe = -1.444; % Non-dimensional elevator derivative for M

Conv.FtToM          = 0.3048; % ft to m
Conv.LbToN          = 4.44822; % lb to N
Conv.SlugFt2ToKgM2  = 1.35581795; % slug*ft^2 to kg*m^2
Conv.SlugFt3ToKgM3  = 515.2381961366; % slug*ft^3 to kg*m^3
Conv.DegToRad       = pi / 180; % deg to rad
```

Values from page 371, Table E.1, case 2

```
E1.Alt      = 20000          * Conv.FtToM;         % Altitude of 747 in meters
E1.b        = 195.68         * Conv.FtToM;         % Wing span in meters
E1.cBar     = 27.31          * Conv.FtToM;         % Mean Aerodynamics Chord length in meters
E1.CD0      = 0.040;                               % Zero-lift Coefficient of Drag
E1.CL0      = 0.654;                               % Zero-lift Coefficient of Lift
E1.Ix       = 0.182  * 10^8  * Conv.SlugFt2ToKgM2; % Moment of Inertia about x axis
E1.Iy       = 0.331  * 10^8  * Conv.SlugFt2ToKgM2; % Moment of Inertia about y axis
E1.Iz       = 0.497  * 10^8  * Conv.SlugFt2ToKgM2; % Moment of Inertia about z axis
E1.Izx      = 0.970  * 10^6  * Conv.SlugFt2ToKgM2; % Product of Inertia about z and x axes
E1.M        = 0.5;                                 % Mach number
E1.rho      = 12.67 * 10^-4  * Conv.SlugFt3ToKgM3; % Density of the air in Kg/m^3
E1.S        = 5500           * (Conv.FtToM)^2;     % Wing Span of 747 in m^2
E1.theta0   = 0;                                   % Theta naught
E1.u0       = 518            * Conv.FtToM;         % Velocity in [m/s]
E1.W        = 6.366  * 10^5  * Conv.LbToN;         % Weight of the 747 in Newtons
E1.m        = E1.W           / Constants.g;        % Mass of the 747
E1.Xi       = -6.8           * Conv.DegToRad;      % Angle between stability and body frames
```

Nondimensional Lateral Derivatives for Boeing 747, Table 6.6, page 187

```
% Non-dimensional Lateral Derivatives for Beta
nDLatDer.Beta.Cy = -0.8771; % Derivative of the dimensionless Y-force coefficient
                            % wrt sideslip angle Beta
nDLatDer.Beta.Cl = -0.2797; % Derivative of the dimensionless L-moment coefficient
                            % wrt sideslip angle Beta
nDLatDer.Beta.Cn = 0.1946;  % Derivative of the dimensionless N-moment coefficient
                            % wrt sideslip angle Beta

% Non-Dimensional Lateral Derivatives for p-hat
```

```
nDLatDer.pHat.Cy = 0;        % Derivative of the dimensionless Y-force coefficient
                               % wrt p-hat
nDLatDer.pHat.Cl = -0.3295;  % Derivative of the dimensionless L-moment coefficient
                               % wrt p-hat
nDLatDer.pHat.Cn = -0.04073; % Derivative of the dimensionless N-moment coefficient
                               % wrt p-hat

% Non-Dimensional Lateral Derivatives for r-hat
nDLatDer.rHat.Cy = 0;       % Derivative of the dimensionless Y-force coefficient
                              % wrt r-hat
nDLatDer.rHat.Cl = 0.304;   % Derivative of the dimensionless L-moment coefficient
                              % wrt r-hat
nDLatDer.rHat.Cn = -0.2734; % Derivative of the dimensionless N-moment coefficient
                              % wrt r-hat
```