```
function dydt = Model_MNL(t, y, Mt, Iz, Lf, Lr, cyf, cyr, lambda, Vx0, Amp, T)
    if (t >= 0.2) && (t <= 8.2)
        u = Amp * sin(2*pi*(t-0.2)/T);
        u = (1/lambda) * u;
    else
        u = 0;
    end

    dydt = [0; 0; 0; 0];

    % y(1) = psi        % angle de lacet
    % y(2) = psidot     % vitesse d'angle de lacet
    % y(3) = Vy         % vitesse latérale
    % y(4) = yG         % position d'angle de lacet

    dydt(1) = y(2);

    % dydt(2) = C_sys/Iz;
    dydt(2) = (2*Lf*cyf/Iz) * deg2rad(u) + 2*(-Lf*cyf+Lr*cyr)/(Vx0*Iz) * y(3) - 2*↙
(Lf*Lf*cyf+Lr*Lr*cyr)/(Vx0*Iz) * y(2);

    % dydt(3) = 1/Mt*F_sys-Vx0*y(2);
    dydt(3) = 2*cyf/Mt * deg2rad(u) - 2*(cyf+cyr)/(Mt*Vx0) * y(3) + (2*(-↙
cyf*Lf+cyr*Lr)/(Mt*Vx0)-Vx0) * y(2);

    dydt(4) = Vx0 * sin(y(1)) + y(3) * cos(y(1));

    dp11 = u - atan((y(3) + Lf*y(2)) / (Vx - Lf*y(2)));
    dp12 = u - atan((y(3) + Lf*y(2)) / (Vx + Lf*y(2)));
    dp21 = -atan((y(3) - Lr*y(2)) / (Vx - Lf*y(2)));
    dp22 = -atan((y(3) - Lr*y(2)) / (Vx - Lf*y(2)));

    By11 = 0;
    Dy11 = 0;
    Cy11 = 0;
    Dy11 = 0;
    Ey11 = 0;

    Fz = Mt * g;
    D = a1*Fz*Fz + a2*Fz;
    C = a0;
    BCD = a3*sin(2*atan(Fz/a4))*(1 - a5*abs(y(1)));
    By = BCD / C / D;
    E = min((a6*Fz + a7), 1);
    Sh = a8*y(1) + a9*Fz + a10;
    Sv = a12*Fz + a13 + (a112*Fz^2 + a111*Fz) * y(1);
end
```