```
function [P_stag_ratio, T_stag_ratio, MFP] = the_var(Ma, T)
[cp1, cv1, gamma1] = sp_heats(T, 'air');

R = 286.9;
c = sqrt(gamma1 * R * T);
U = Ma * c;

target = 0.5 * U^2;
cp_int = 0;
pressure_int = 0;
To = T;
dT = 0.01;

% Increment until To is found
while (cp_int < target)
%     cp_int
%     target
    To = To + dT;
    dcp_int = sp_heats(To, 'air') * dT;
    cp_int = cp_int + dcp_int;
    pressure_int = pressure_int + dcp_int / (R * To);
end
P_stag_ratio= exp(pressure_int);
T_stag_ratio = To / T;
MFP = Ma * sqrt(gamma1) * sqrt(T_stag_ratio) / P_stag_ratio;
end
```

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