Dynstable Computer Code - Fortran

Dynstable is a FORTRAN computer code that will calculate the eigenvalues and the eigenvectors of the complete system matrix for an aircraft. The input file is NAVION.DAT and includes the geometric properties and the non-dimensional stability derivatives for the vehicle of choice (the example is for the Navion aircraft). Because of the nature of FORTRAN it is best to use the NAVION.DAT data file as a template for any new data entered, that is replace the existing numbers with the new numbers of the aircraft of interest. The data must be entered on the same lines as in the NAVION.DAT file with spaces between the numbers. The inputs are as follows:

line

1) Name that contains 20 characters or less, including spaces
2) The logical variable .TRUE. or .FALSE. .TRUE. Calculate eigenvalues and eigenvectors, while .FALSE. calculates just eigenvalues. Note that there is a period before and after the input .true. or .false. (Also note that upper or lower case can be used. If in doubt or problems occur use upper case!)
3) Wing span, chord, area, vehicle mass, and thrust coefficient. The thrust coefficient is usually set equal to zero for gliding and cruise flight. Powered climbs usually requires a number not zero here.
4) Ix, Iy, Iz, Ixy, Ixz, Iyz, the three moments of inertia and the three products of inertia respectively.
5) p, q, and r are the angular rates. These are zero for straight and level flight. They are not arbitrary as they flight condition must be steady state. A coordinated turn would yield non zero values of these.
6) 1, alpha, beta, V : a 1 in the first entry (no decimal point) requires the angle of attack and sideslip angle followed by the airspeed (velocity)- alternatively a 2 in the first entry would require the x,y, and z components of velocity (u,v,w) in the next three entries.
7) 1, theta, phi, q-bar, mach number, thrust angle with respect to x axis (epsilon positive up), and thrust angle out of plane of symmetry (positive to the right) Generally the thrust angles are zero!
8) 2 use a 2 here although for symmetric flight 1,2, and 4 should yield the same result.
9) These are 6 zeros (These terms account for the thrust coefficient changes with respect to velocity, angle of attack, sideslip angle and the three angular rates p,q, and r. (usually zero!)
10) 3 zeros here. These terms account for the thrust off set. If the thrust vector does not pass through the center of gravity, there could be a moment due to thrust. If the entries in (9) are zero, then the values of these terms have little effect.
11)-15) The next 5 row deal with the change in the drag, sideforce, lift, roll, pitch and yaw moment coefficients with respect to alpha_dot, beta_dot, p_dot, q_dot, and r_dot respectively. Only alpha_dot and beta_dot terms should be non-zero, but most of those are zero as in the example
16) 3 zeros here - these are for submarines and blimps - so called added mass terms. I believe this part of the code is disabled.

17) CD, CY, CL, Cl, Cm, Cn - Trim values of these variables. All but CD and CL are zero.
18)-24) The stability derivatives of CD, CY,, CL, Cl, Cm, Cn respectively with the variables (one row per variable) alpha, beta, Mach number, Thrust coefficient, roll, pitch, and yaw rates. Many of these are zero - see example, however, some of the zeros in the example problem can be non zero for other problems.
25) 4 zeros here. They represent the buoyant mass, x,y, and z of buoyant center - used for submarines and blimps.

These are the entries as indicated in NAVION.DAT The contents of each row cannot change. If the variable is zero or unknown, a zero must be entered.

This file should be in the same directory as the dynstable.exe file. It must be named NAVION.DAT. That is what the code is looking for

The output is placed in the file STAB8.DAT (there is also a file STAB6.DAT that is for info purposes like debugging).