```
% C. Petersen, H. Werkle, Dynamik der Baukonstruktionen
% 2. Auflage, Springer Vieweg, Wiesbaden, 2018
%
% ML_10_1_Eigenfrequenzen_schubweicher_Balken: Eigenfrequenzen schubweicher
% Balken mit elastischer Bettung
%
% Version 1.0, April 2018
% Softwareentwicklung:
% Andrei Firus, M.Eng (andrei.firus@gmail.com)

% Aufbau Eingabedateien: Eingabedatei nicht notwendig
%
% Ausgabedateien:
% Outputdatei_1: Eingaben- und Ergebnisübersicht

%---------------------------- EINGABEBLOCK --------------------------------
% Eingaben im Quellcode

l=120;                  % Balkenlänge [m]
my=2500;                % Masse pro Längeneinheit [kg/m]
dy=8000;                % Drehmassebelegung [kg*m^2/m]
EI=1.0097*10^11;        % Biegesteifigkeit [N*m^2]
GA=9.369*10^8;          % Schubsteifigkeit [N]
c=0;                    % Bettungsziffer [N/m/m]
k=0;                    % Drehbettungsziffer [Nm/1/m]
H=0;                    % Längskraft [N]: Zugkraft (+), Druckkraft (-)

n=5;                    % Anzahl der gesuchten Eigenfrequenzen
%--------------------------------------------------------------------------

%-------------------------- BERECHNUNGSBLOCK ------------------------------
% Definition der Ergebnissvektoren
omega=zeros(1,n);
Freq=zeros(1,n);
T=zeros(1,n);
sqr_omega=zeros(1,n);

% Berechnung der Eigenfrequenzen
for j=1:1:n
    a0=my*dy/GA;
    a1=-(((1+H/GA)*dy+EI*my/GA)*j^2*pi^2/l^2+(1+k/GA)*my+c*dy/GA);
    a2=((1+H/GA)*EI*j^4*pi^4/l^4+((1+k/GA)*H+EI*c/GA+k)*j^2*pi^2/l^2+...
        (1+k/GA)*c);
    if a0==0
        o2=-a2/a1;
    else
        p=a1/a0;
        q=a2/a0;
        o2=-(p/2)-sqrt((p/2)^2-q);
    end
    omega(j)=sqrt(o2);
    Freq(j)=omega(j)/(2*pi);
    T(j)=1/Freq(j);
    sqr_omega(j)=omega(j)^2;
end
%--------------------------------------------------------------------------
```

```
%---------------------------- AUSGABEBLOCK --------------------------------
% Ausgabe der Ergebnisse in eine Datei
fid = fopen('Outputdatei_1_Allgemein.txt', 'w');
fprintf(fid,...
    '%s\n','C. Petersen, H. Werkle, Dynamik der Baukonstruktionen');
fprintf(fid,...
    '%s\n','2. Auflage, Springer Vieweg, Wiesbaden, 2018');
fprintf(fid,...
    '%s\n','Softwareentwicklung: Andrei Firus (andrei.firus@gmail.com)');
fprintf(fid,'%s\n','Programm ML_10_1: Eingaben- und Ergebnisuebersicht');
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,...
    '%s\n','-----------------------------------------------------------------');
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,...
    '%s\n','EINGABEDATEN:');
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Stablaenge [m]:');
fprintf(fid,'%d\n',l);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Masse pro Laengeneinheit [kg/m]:');
fprintf(fid,'%d\n',my);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Drehmassenbelegung [kgm^2/m]:');
fprintf(fid,'%d\n',dy);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Biegesteifigkeit [Nm^2]:');
fprintf(fid,'%d\n',EI);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Schubsteifigkeit [N]:');
fprintf(fid,'%d\n',GA);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Bettungsziffer [N/m/m]:');
fprintf(fid,'%d\n',c);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Drehbettungsziffer [Nm/1/m]:');
fprintf(fid,'%d\n',k);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Laengskraft [N]:');
fprintf(fid,'%d\n',H);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Anzahl der gesuchten Eigenfrequenzen [-]:');
fprintf(fid,'%d\n',n);
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,...
    '%s\n','-----------------------------------------------------------------');
```

```
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,...
    '%s\n','ERGEBNISSE:');
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fprintf(fid,'%s\n','Berechnungsergebnisse:');
fprintf(fid,'%s \t %s \t  %s \t %s \t %s\n','Index',...
    'Eigenfrequenzquadrat [1/s^2]',...
    'Eigenkreisfrequenz [1/s]', 'Eigenfrequenz [Hz]',...
    'Eigenschwingzeit [s]');
for ii=1:1:n
    fprintf(fid,'%d \t %d \t %d \t %d \t %d\n',ii,sqr_omega(ii),...
        omega(ii),Freq(ii),T(ii));
end
fprintf(fid, '%s\n', ' ');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fclose(fid);
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%--------------------------------------------------------------------------------
```