Signals in terms of their frequency content

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y(t) -> Y(jw) : Fourier Transform

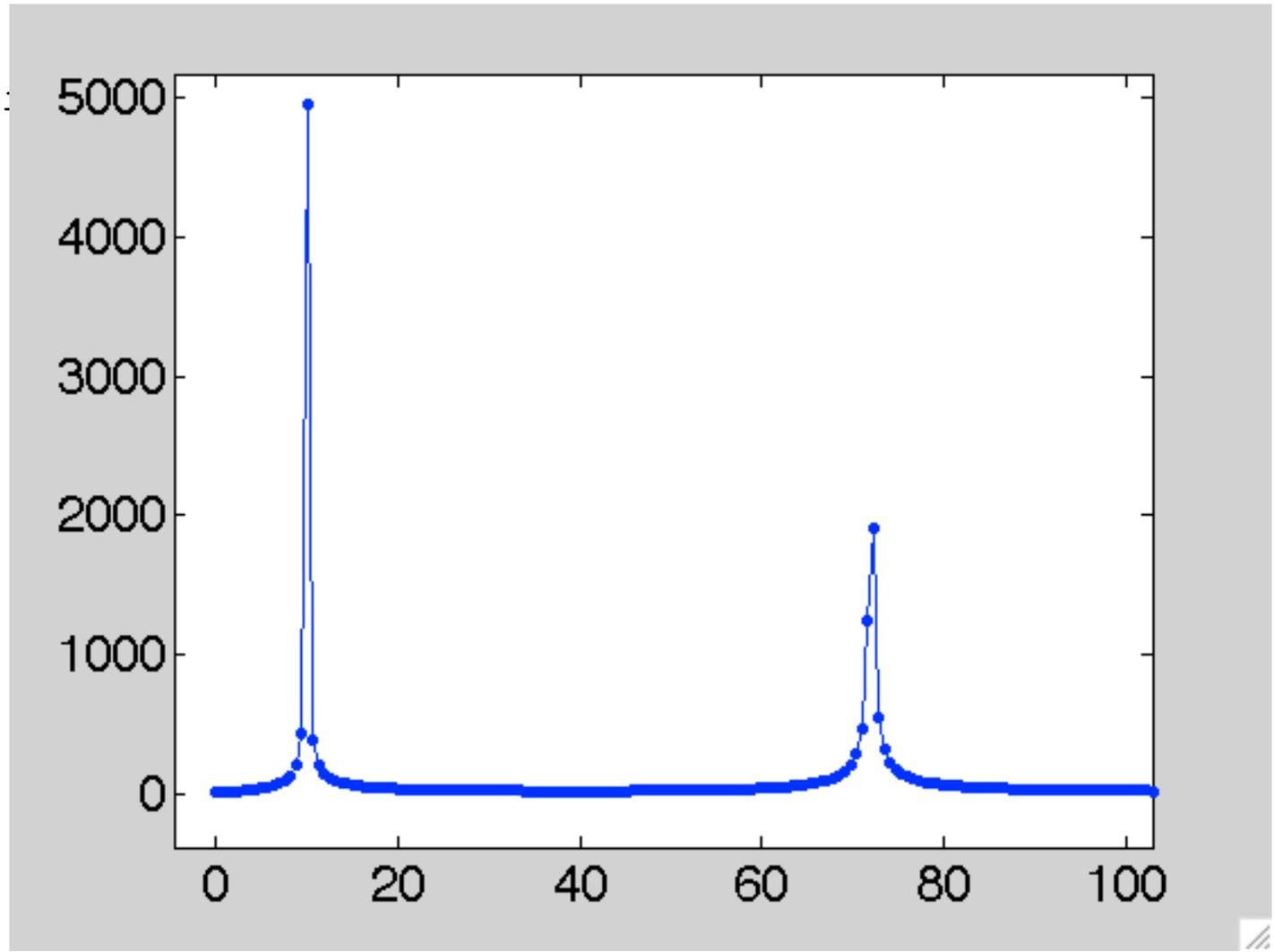
OR, equivalently,

y(t) -> Y(s) (Laplace Transform) -> (set s= jw): Y(jw)

```
%% a signal consisting of two sinusoids
clear all
Ts = 0.001;Fs = 1/Ts;
time = [0:Ts:10]';

%signal
y=  sin(10*time + pi/10) + 0.5*sin(72*time + pi/10);

%% (discrete) Fourier Transform: Y(jw)
Y = fft(y);
%%
number_of_samples=length(time);
W = [0:1:number_of_samples-1]*2*pi
% plot |Y(jw)| vs w
figure
plot(W,abs(Y),'b.-');
```



Frequency content of jet engine combustor pressure y(t)

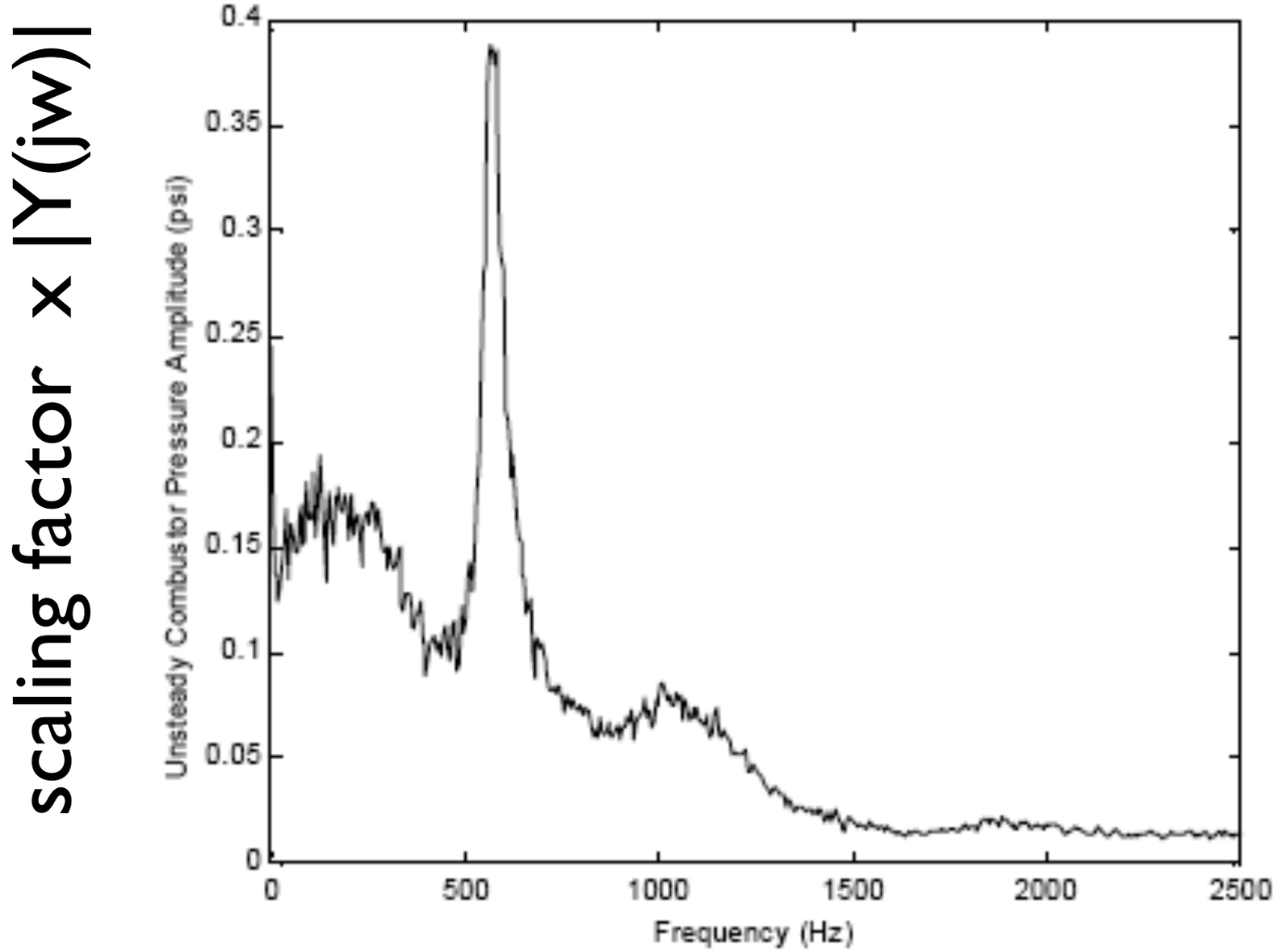
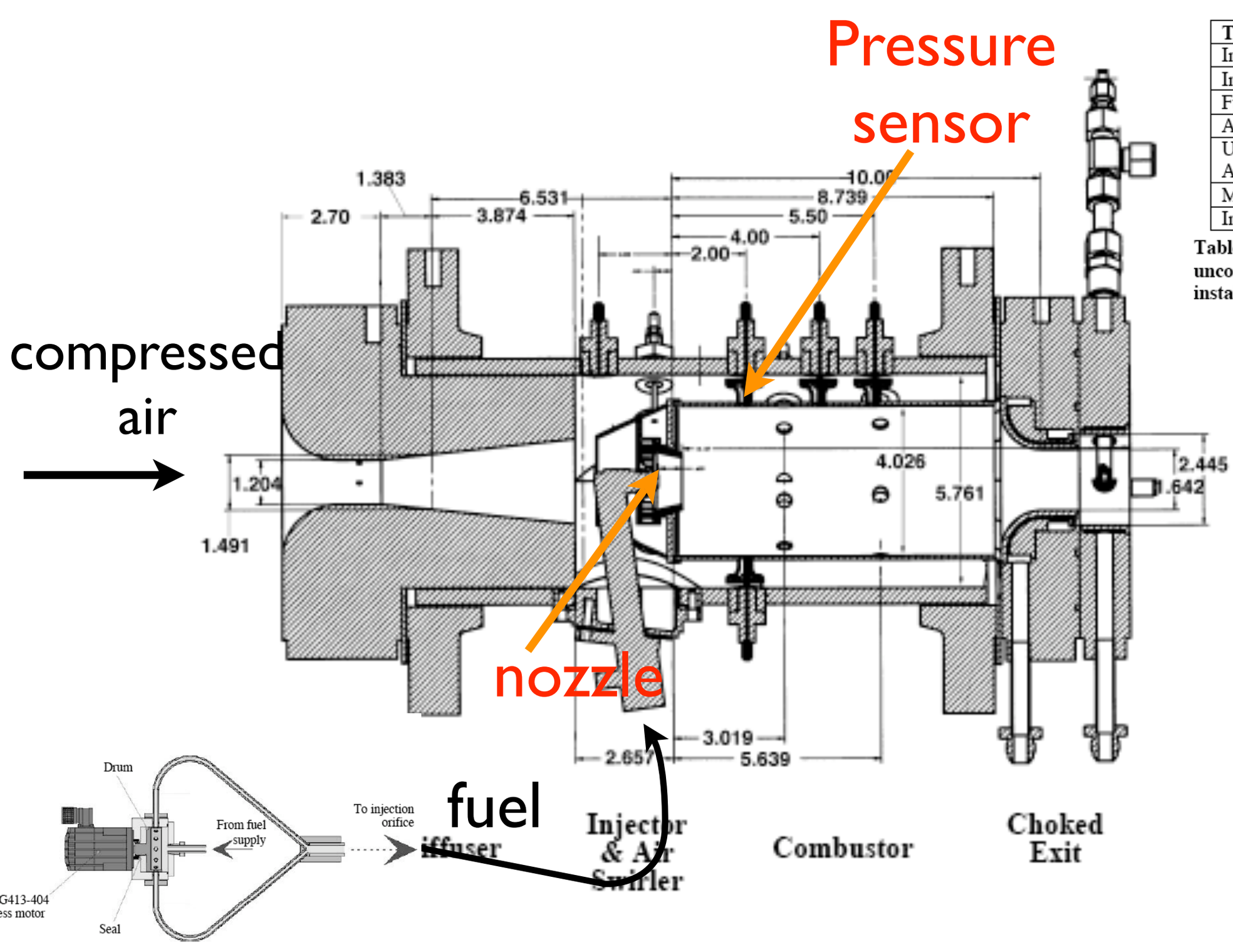


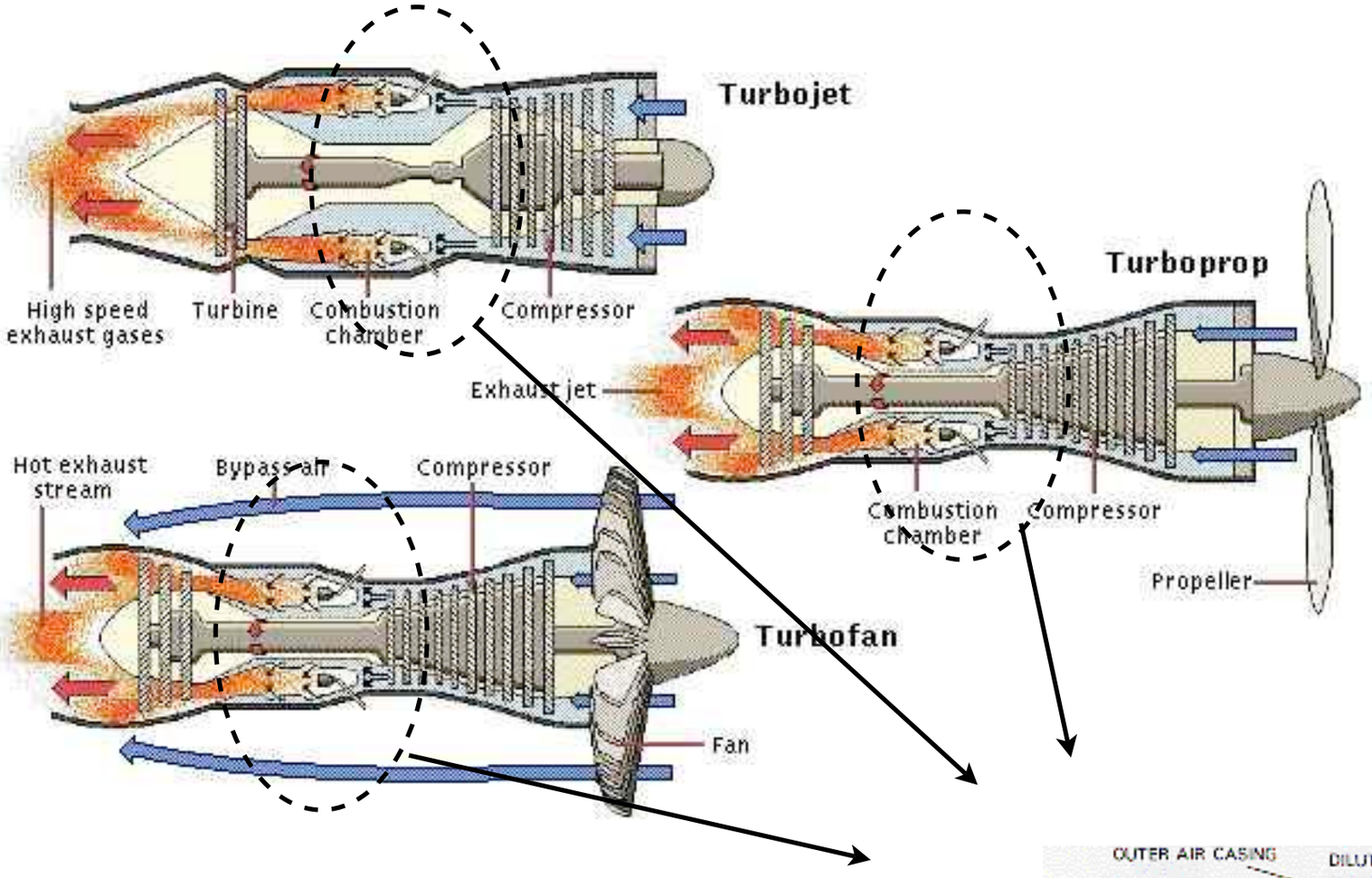
Figure 8. Measured power spectrum of unsteady combustor pressure at x = 2.0 in. for Evaluation Point operating conditions, showing resonance at 566 Hz, with an amplitude of 0.39 psi (0.78 psi p-p).

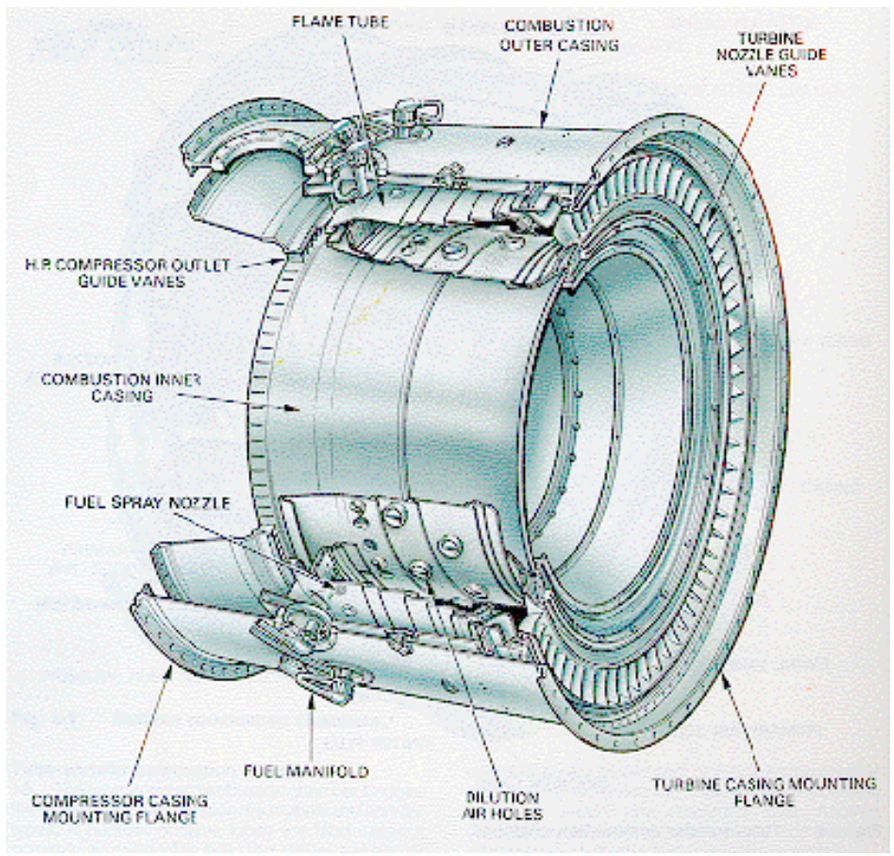
Test Variable	Mean Value
Inlet air pressure, P_3 (psia)	110
Inlet air temperature, T_3 (°F)	610
Fuel flow rate, W_f (lbm/hr)	207
Air flow rate, W_a (lbm/sec)	2.55
Unsteady Pressure Amplitude, P'comb (psi.)	6.5
Mean fuel/air ratio	0.022
Instability Frequency (Hz)	280

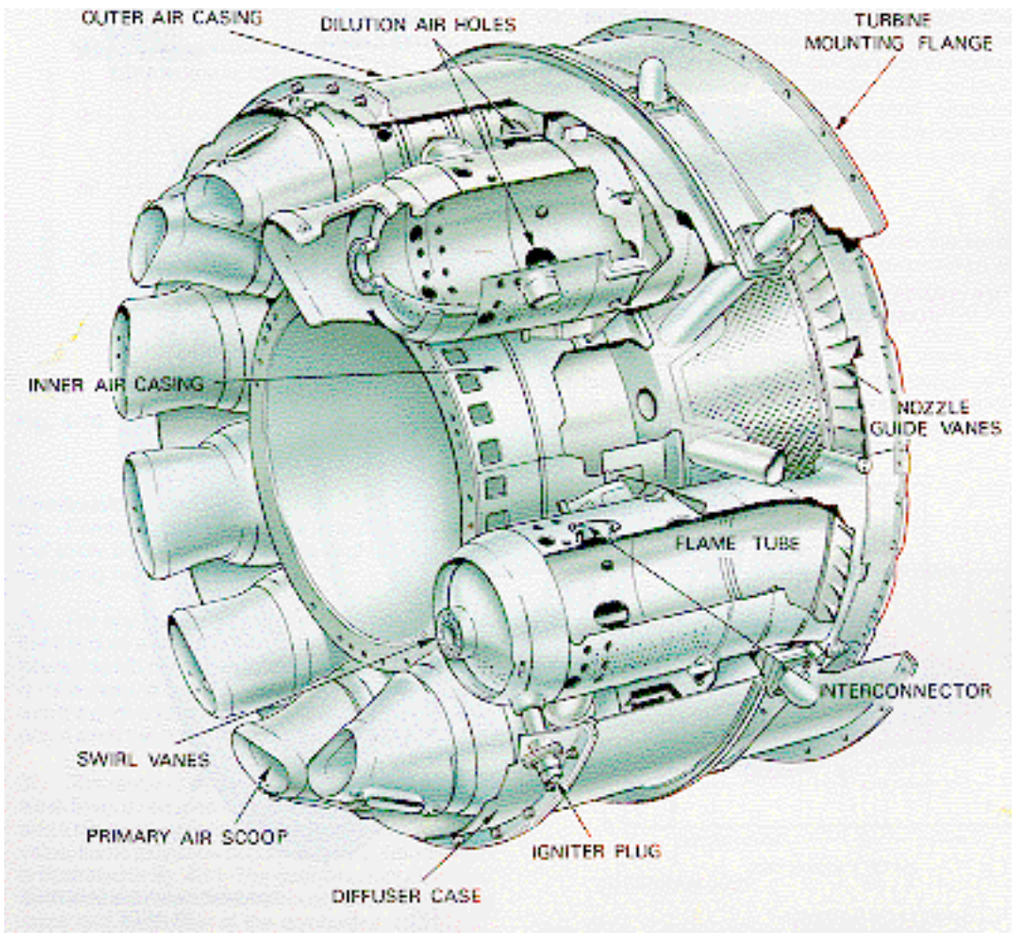
Table 1.2 - 1: Combustor operating conditions and uncontrolled instability characteristics for 300-Hz instability.



Single-can combustor rig at UTRC (4 MW)
(United Technologies Research Center)


Turbojet
High speed exhaust gases
Turbine
Combustion chamber
Compressor
Turboprop
Exhaust jet
Combustion chamber
Compressor
Propeller
Hot exhaust stream
Bypass air
Compressor
Turbofan
Fan


FLAME TUBE
COMBUSTION OUTER CASING
TURBINE NOZZLE GUIDE VANES
H.P. COMPRESSOR OUTLET GUIDE VANES
COMBUSTION INNER CASING
FUEL SPRAY NOZZLE
FUEL MANIFOLD
COMPRESSOR CASING MOUNTING FLANGE
DILUTION AIR HOLES
TURBINE CASING MOUNTING FLANGE


OUTER AIR CASING
DILUTION AIR HOLES
TURBINE MOUNTING FLANGE
INNER AIR CASING
NOZZLE GUIDE VANES
FLAME TUBE
INTERCONNECTOR
SWIRL VANES
PRIMARY AIR SCOOP
IGNITER PLUG
DIFFUSER CASE