```
function
[x,angle]=GAT_2nd_generation(fs,speed,load,speed_load_plane,speed_axis,load_axis,respon
se,ratio)

% OUTPUT:
% x - generated signal
% angle - angular increments in which signal is observed
%
% INPUT:
% fs - sampling frequency [hz]
% speed - rotational speed profile [hz] - length = length(x)
% load - load profile [any units] - length = length(x)
% speed_load_plane - values of the amplitude as a function of speed and load
% speed_axis - speed axis for speed_load_plane [hz]
% load_axis - load axis for speed_load_plane [same units as 'load']
% ratio - angular frequency of signal to be generated [1/rotation]
% response - pulse response

dt=1/fs;

speed=speed*ratio;

angle=cumsum(speed*dt)*2*pi;
N=length(speed);
T=N/fs;
df=fs/N;

t=linspace(0,T-dt,N);

pulses=zeros(1,N);
total_angle=2*pi/ratio;
for i=1:N

    if angle(i)>total_angle
        pulses(i+round(10*(rand(1)-0.5)))=1;
       total_angle=total_angle+2*pi;

    else

    end
end



[X,Y]= meshgrid(speed_axis,load_axis');
amplitude=interp2(X,Y,speed_load_plane,speed,load,'spline');

response(end+1:N)=0;
scaled_pulses=pulses.*amplitude;

x=real(ifft(fft(scaled_pulses).*fft(response)));
```