Calculo de Frecuencias para TPM1, TPM2 y TPM3

```
clockFrequency = 42000000;     % 42 MHz
prescaler = 128;
pulseDuration = 0.0002;        % in seconds
minDelayBetween = 0.0003;
motorSteps = 200;
radius = 5;
```

```
targetX = 1;
targetY = 2;
targetZ = 10;
```

```
positionX = 0;
positionY = 0;
positionZ = 0;
stepsX = 0;
stepsY = 0;
stepsZ = 0;

distanceX = targetX - positionX;
if distanceX < 0
    distanceX = distanceX * -1;
    fprintf('Direction: %d\n', true);
else
    fprintf('Direction: %d\n', false);
end
```

```
Direction: 0
```

```
stepsX =((distanceX * motorSteps) / (2.0 * pi * radius));



distanceY = targetY - positionY;
if distanceY < 0
    distanceY = distanceY * -1;
    fprintf('Direction: %d\n', true);
else
    fprintf('Direction: %d\n', false);
end
```

```
Direction: 0
```

```
stepsY =((distanceY * motorSteps) / (2.0 * pi * radius));


distanceZ = targetZ - positionZ;
if distanceZ < 0
    distanceZ = distanceZ * -1;
    fprintf('Direction: %d\n', true);
else
    fprintf('Direction: %d\n', false);
end
```

```
Direction: 0
```

```
stepsZ =((distanceZ * motorSteps) / (2.0 * pi * radius));
```

```
maxSteps = max([stepsX, stepsY, stepsZ]);
fprintf('Max: %d\n', maxSteps);
```

```
Max: 6.366198e+01
```

```
timeInstruction = maxSteps * (pulseDuration + minDelayBetween);
moduleValue = (timeInstruction * clockFrequency) / prescaler;
channelValue = (clockFrequency * pulseDuration) / prescaler;

fprintf('Module Value: %d\n', moduleValue);
```

```
Module Value: 1.044454e+04
```

```
fprintf('Channel Value: %d\n', channelValue);
```

```
Channel Value: 6.562500e+01
```

```
XmoduleValue = moduleValue * maxSteps / stepsX;
YmoduleValue = moduleValue * maxSteps / stepsY;
ZmoduleValue = moduleValue * maxSteps / stepsZ;

fprintf('Module Value X: %d\n', XmoduleValue);
```

```
Module Value X: 1.044454e+05
```

```
fprintf('Module Value Y: %d\n', YmoduleValue);
```

```
Module Value Y: 5.222272e+04
```

```
fprintf('Module Value Z: %d\n', ZmoduleValue);
```

```
Module Value Z: 1.044454e+04
```

```matlab
% Calculate the number of clock pulses for each module
XnumPulses = round(XmoduleValue * stepsX);
YnumPulses = round(YmoduleValue * stepsY);
ZnumPulses = round(ZmoduleValue * stepsZ);

% Initialize flag counts
XflagCount = 0;
YflagCount = 0;
ZflagCount = 0;

% Initialize arrays to store the plotted points
Xpoints = zeros(XnumPulses, 1);
Ypoints = zeros(YnumPulses, 1);
Zpoints = zeros(ZnumPulses, 1);

% Time loop simulation
for i = 1:(moduleValue * maxSteps)
    % Plot a point for each module
    if mod(i, round(XmoduleValue)) == 0
        Xpoints(i) = i;
        XflagCount = i;
    end
    if mod(i, round(YmoduleValue)) == 0
        Ypoints(i) = i;
        YflagCount = i;
    end
    if mod(i, round(ZmoduleValue)) == 0
        Zpoints(i) = i;
        ZflagCount = i;
    end

    % Break the loop if the module with the greatest number of pulses finishes

end

% Display flag counts
fprintf('\nFlag Counts:\n');
```

```
Flag Counts:
```

```matlab
fprintf('X Module: %d\n', XflagCount);
```

```
X Module: 626670
```

```matlab
fprintf('Y Module: %d\n', YflagCount);
```

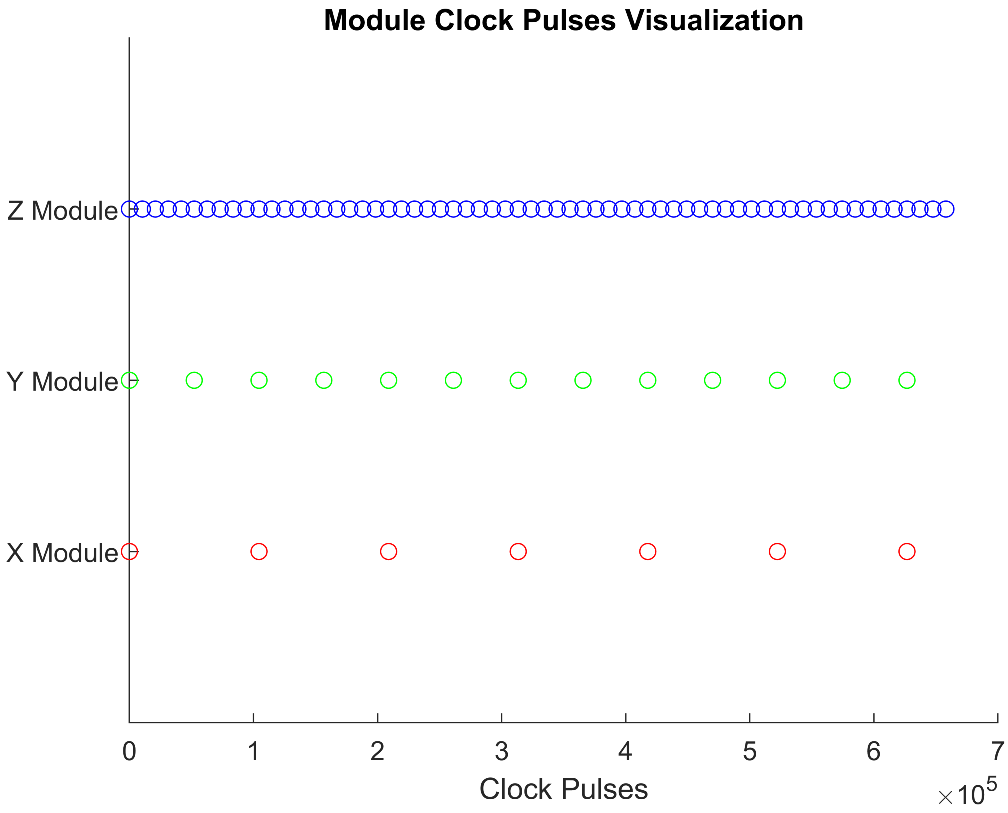
```
Y Module: 626676
```

```matlab
fprintf('Z Module: %d\n', ZflagCount);
```

```
Z Module: 658035
```

```
% Plotting the points for each module
figure;
hold on;
plot(Xpoints, ones(size(Xpoints)), 'ro');
plot(Ypoints, ones(size(Ypoints)) * 2, 'go');
plot(Zpoints, ones(size(Zpoints)) * 3, 'bo');
hold off;

ylim([0, 4]);
yticks([1, 2, 3]);
yticklabels({'X Module', 'Y Module', 'Z Module'});
xlabel('Clock Pulses');
title('Module Clock Pulses Visualization');
```


Module Clock Pulses Visualization
Z Module
Y Module
X Module
Clock Pulses
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