Contents

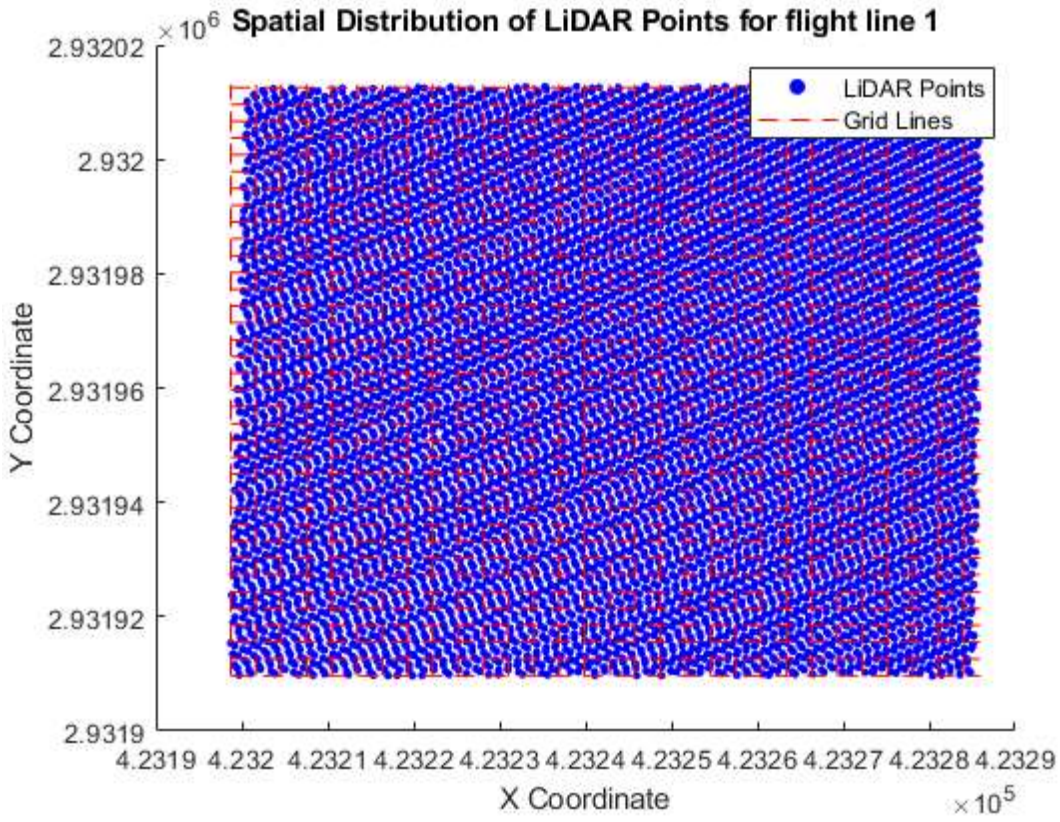
Flight line 1

Load the CSV file

```
data = csvread('swath1.csv'); % Assuming the first row contains headers

% Extract x, y coordinates, and z values
x = data(:, 1);
y = data(:, 2);
z = data(:, 3);

% Define NPS and grid size
NPS = 1.4696;
grid_size = 2 * NPS;

% Define the grid
x_min = min(x);
x_max = max(x);
y_min = min(y);
y_max = max(y);
x_grid = x_min : grid_size : x_max;
y_grid = y_min : grid_size : y_max;

% Count the number of points falling within each grid cell
num_points_in_grid = histcounts2(x, y, x_grid, y_grid);

% Calculate the percentage of grid cells with at least one LiDAR point
total_grid_cells = numel(x_grid) * numel(y_grid);
num_filled_grid_cells = sum(num_points_in_grid(:) > 0);
percentage_filled = (num_filled_grid_cells / total_grid_cells) * 100;

% Determine if the spatial distribution is uniform or non-uniform
if percentage_filled >= 90
    disp('Spatial distribution for flight line 1 is uniform.');
else
    disp('Spatial distribution for flight line 1 is non-uniform.');
end

% Plot the points
scatter(x, y, 10, 'b', 'filled');
hold on;

% Plot the grid lines
for i = 1:numel(x_grid)
    line([x_grid(i), x_grid(i)], [y_min, y_max], 'Color', 'r', 'LineStyle', '--');
end
for j = 1:numel(y_grid)
    line([x_min, x_max], [y_grid(j), y_grid(j)], 'Color', 'r', 'LineStyle', '--');
end

% Set plot title and labels
```

```
title('Spatial Distribution of LiDAR Points for flight line 1');
xlabel('X Coordinate');
ylabel('Y Coordinate');
legend('LiDAR Points', 'Grid Lines');
```

```
Spatial distribution for flight line 1 is uniform.
```

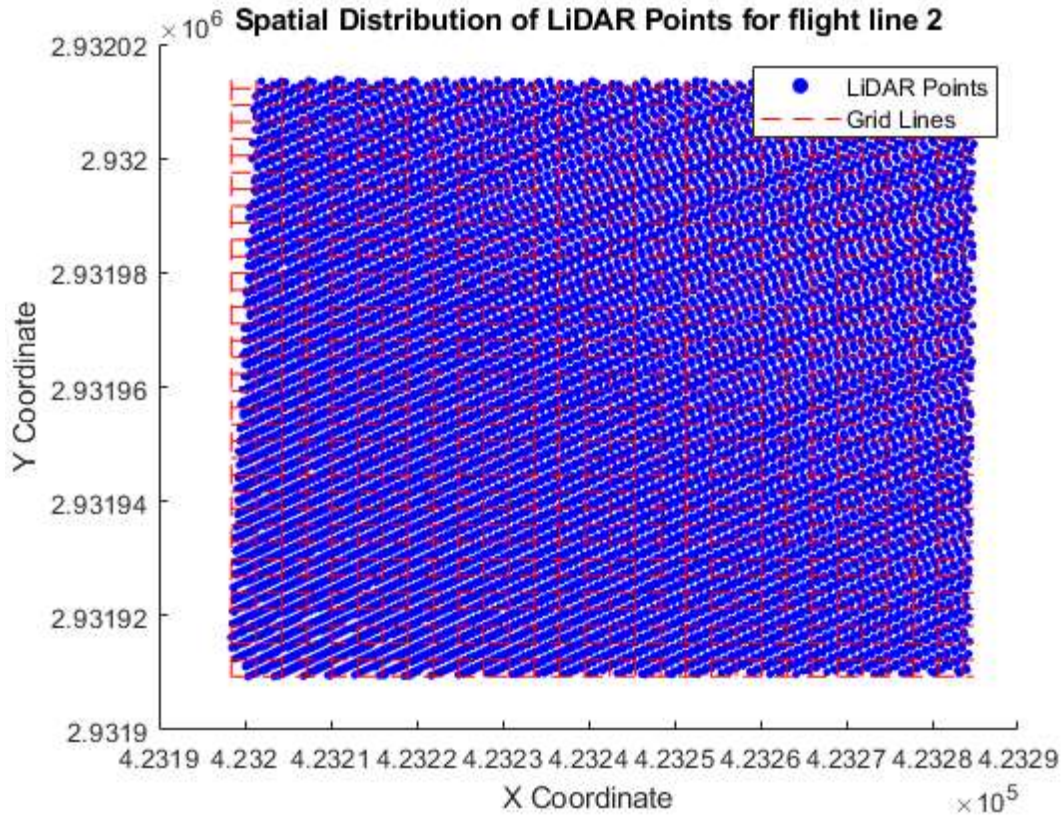


Flight line 2

```
% Load the CSV file
data = csvread('swath2.csv'); % Assuming the first row contains headers

% Extract x, y coordinates, and z values
x = data(:, 1);
y = data(:, 2);
z = data(:, 3);

% Define NPS and grid size
NPS = 1.4696;
grid_size = 2 * NPS;

% Define the grid
x_min = min(x);
x_max = max(x);
y_min = min(y);
y_max = max(y);
x_grid = x_min : grid_size : x_max;
y_grid = y_min : grid_size : y_max;
```

```
% Count the number of points falling within each grid cell
num_points_in_grid = histcounts2(x, y, x_grid, y_grid);

% Calculate the percentage of grid cells with at least one LiDAR point
total_grid_cells = numel(x_grid) * numel(y_grid);
num_filled_grid_cells = sum(num_points_in_grid(:) > 0);
percentage_filled = (num_filled_grid_cells / total_grid_cells) * 100;

% Determine if the spatial distribution is uniform or non-uniform
if percentage_filled >= 90
    disp('Spatial distribution for flight line 2 is uniform.');
else
    disp('Spatial distribution for flight line 2 is non-uniform.');
end

figure;
% Plot the points
scatter(x, y, 10, 'b', 'filled');
hold on;

% Plot the grid lines
for i = 1:numel(x_grid)
    line([x_grid(i), x_grid(i)], [y_min, y_max], 'Color', 'r', 'LineStyle', '--');
end
for j = 1:numel(y_grid)
    line([x_min, x_max], [y_grid(j), y_grid(j)], 'Color', 'r', 'LineStyle', '--');
end

% Set plot title and labels
title('Spatial Distribution of LiDAR Points for flight line 2');
xlabel('X Coordinate');
ylabel('Y Coordinate');
legend('LiDAR Points', 'Grid Lines');
```

```
Spatial distribution for flight line 2 is uniform.
```



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