Exercise 6

Exercise 6.1

Figure 1 shows a rectangle which consists of two adjacent triangles and a point p. When interpolating this point inside the rectangle, all corners (1 - 4) are considered. But, the colour of point p will be different when interpolating inside the left triangle only the corners 1, 2 and 3 will be considered. There is an even higher difference when point p is near the centre of the rectangle. This effect increases when the triangle has a acute angle, because then the corners ca be far away and therefore the colour will be different. Having a triangulation that satisfies the Delaunay properties may decrease this effect. So in general the triangles are distributed more evenly and the difference of colour is less.
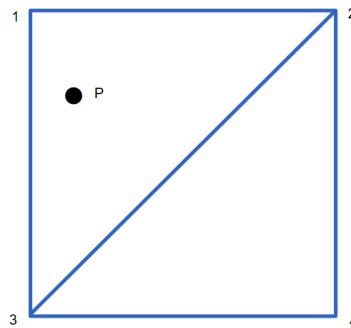

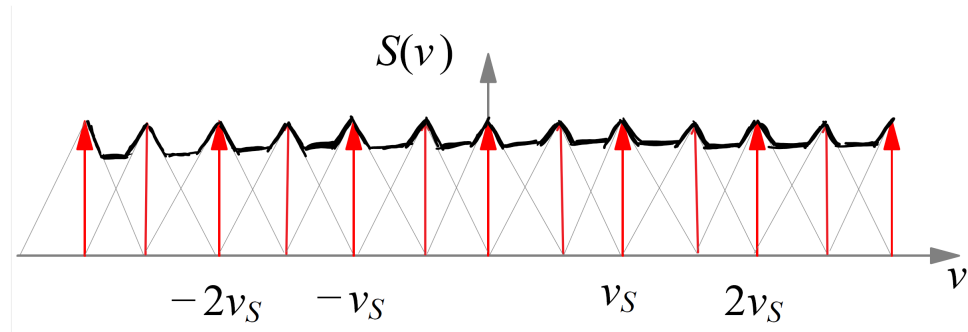Figure 1:

Exercise 6.2

see attachments

Exercise 6.3

6.3.1

Nyquist - Shannon Theorem: The minimum sampling frequency of a signal that it will not distort its underlying information, should be double the frequency of its highest frequency component.
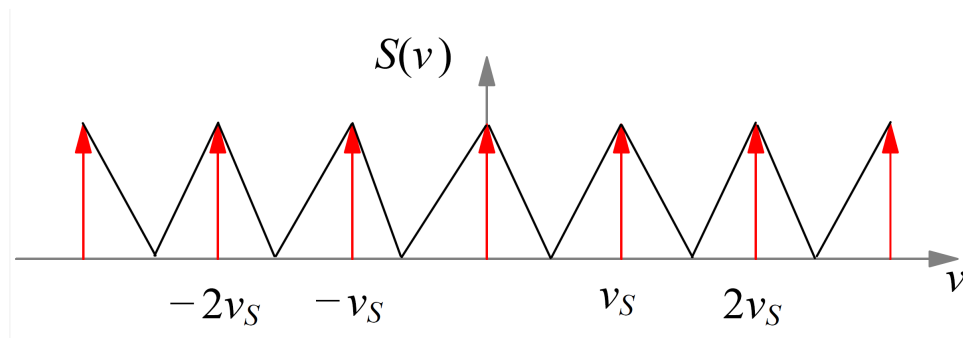
$\nu_s \leq \dfrac{1}{2} * \nu_x$

6.3.2

condition of 1. not fullfilled:

condition 1. fullfilled:

6.3.3

Use the sinc function to reconstruct original signal with corresponding frequency (blue line).