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Freiburg, 13 July 2007
Due until 20 July 2007

Exercises of lecture

Mobile Ad Hoc Networks

Summer 2007

Sheet 12

SECTION 1:
Mobility models

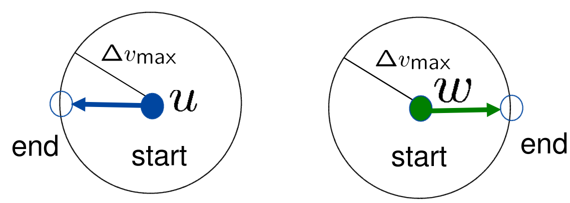

Figure 1: Pedestrian Mobility

1. Let u and w be two pedestrians with a link established between them. Both of them can move at the maximum speed of 2.0 m/s with the aid of a transport mean. The transmission range of their mobile devices are 50 meters.

   (a) Based on V_{max}, explain how can the transmission power be dynamically changed to maintain the link between them.

   Table 1: Pedestrian location, with 1 unit: 1 meter

Time	**u(x,y)**	**w(x,y)**
0	(2,2)	(4,3)
2	(1,3)	(5,4)
4	(1,5)	(6,5)
6	(1,7)	(7,6)
8	(1,9)	(8,7)
10	(1,11)	(9,8)

   (b) If the actual position of u and w over 10 seconds are as indicated in Table 1, argue if the method used in the previous question is efficient in terms of energy consumption.

SOLUTIONS:

1. Refer to lecture 12: Pedestrian Model.

2. Approximation without continuous time: If speed can be predicted, energy is wasted using this method.

   (a) For each t, find the new transmit range, $r_{safe} = |u - w|_2 + 2\delta V_{max}$ and the actual distance, $r_{real} = d_{t+\delta}$. Calculate their transmission energy using $E = c \cdot r^2$.

   (b) Get the energy difference.

   (c) Sum up the difference for each t.

   If speed can not be predicted, energy is saved using this method. Use the same procedure but compare the energy consumption with that using the maximum transmit range.