Call	Departure floor	Destination floor
r1	2	1
r2	15	1
r3	40	1

Table 1

The following table presents the parameters connected to the elevator E1.

Parameter	Value
Rated speed of elevator car	4 m/s
Acceleration of elevator car	1 m/s**2
Jerk	1.6 m/s**3
Capacity	13 persons
Door opening time	3 s
Door closing time	3.1 s
Person transfers (in, out)	2 s

Table 2

The following table presents the parameters connected to the building.

Parameter	Value
Number of floors	40 floors
Floor-to-floor height	3.3 m

Table 3

Table 4 presents the waiting times and travel times connected to the optimal routing calculated according to the invention.

Magnitude	r1	r2	r3	Average
Waiting time (s)	10.41	45.10	112.27	55.93
Travel time (s)	21.82	68.37	156.17	88.12

Table 4

Parameter	Value
Rated speed of elevator car	4 m/s
Acceleration of elevator car	1 m/s**2
Jerk	1.6 m/s**3
Capacity	1800 kg

Table 7

When the route of the elevator is optimized with the method according to the invention, an energy consumption of 102 Wh is obtained and correspondingly 293 Wh with routing based on conventional collective control, the difference being 187%. (In the calculation the values of Table 3 have been used as the parameters of the building).

Fig. 2a presents an optimized route of the elevator E1 according to Embodiment 2, and Fig. 2b a route based on the collective control according to Embodiment 2.

The method according to the invention is also applicable to elevator systems in which up/down call-giving pushbuttons are used for calling an elevator to a floor. According to one embodiment of the invention the control system makes an assumption about the destination floor e.g. in such a way that when pressing the up call pushbutton the topmost floor that the elevator system serves is used as the default floor. Correspondingly, when pressing the down call button, the bottommost floor that the elevator system serves is used as the default floor. It is also possible to collect statistical data about the elevator journeys made by passengers and to use the data in question to advantage in the definition of the default floor.

CLAIMS

1. A method for controlling an elevator system having at least one elevator, call-giving devices for giving calls to the elevator system, and a control system that is responsive to the aforementioned calls, comprising:

registering a call given by a passenger;

allocating an elevator serving the registered call in a first optimization phase such that a desired first cost function is minimized;

providing a second optimization phase for optimizing a route of the allocated elevator such that a desired second cost function is minimized; and

controlling the allocated elevator according to the route;

wherein one of the first cost function and the second cost function comprises energy consumption, and the other of the first cost function and the second cost function comprises at least one of call time, waiting time, travel time, run time, and traffic intensity.

2. The method according to claim 1, further comprising:

updating the route of the elevator by repeating the second optimization phase during elevator service.

3. The method according to any one of the preceding claims, wherein a genetic algorithm is used in the first optimization phase, and/or in the second optimization phase.

4. The method according to any one of the preceding claims, wherein a collective control principle is used in the first optimization phase.

5. The method according to any one of the preceding claims, wherein the first cost function and/or the second cost function is minimized for at least one desired magnitude with a set boundary condition.

6. The method according to any one of the preceding claims, further comprising:

making an assumption about the destination floor of a passenger,

wherein the assumption about the destination floor is that a default floor is a top most floor that the elevator system serves when pressing an up call pushbutton, and the assumption about the destination floor is that the default floor is a bottommost floor that the elevator serves when pressing a down call button.

CLAIMS

1. Method for controlling an elevator system, which elevator system comprises: at least one elevator; call-giving devices for giving calls to the elevator system; and a control system that is responsive to the aforementioned calls, **characterized in that** the method comprises the phases;

a call given by a passenger is registered;

an elevator serving the registered call is allocated in a first optimization phase in such a way that a desired first cost function is minimized;

the route of the allocated elevator is optimized in a second optimization phase in such a way that a desired second cost function is minimized; and

the allocated elevator is controlled according to the optimized route

2. Method according to claim 1, **characterized in that** the method further comprises the phase:

the optimized route of an elevator is updated by repeating the second optimization phase during the elevator service.

3. Method according to any of the preceding claims, **characterized in that** the method further comprises the phase:

genetic algorithms are utilized in the first and/or in the second optimization phase.

4. Method according to any of the preceding claims, **characterized in that** the method further comprises the phase:

the collective control principle is used in the first optimization phase.

5. Method according to any of the preceding claims, **characterized in that** the first cost function and/or the second cost function comprises at least one magnitude related to the operation of the

elevator system, which magnitudes are: call time, waiting time, travel time, run time, traffic intensity, energy consumption.

6. Method according to any of the preceding claims, **characterized in that** the first cost function and/or the second cost function is minimized for at least one desired magnitude with a set boundary condition.

7. Method according to any of the preceding claims, **characterized in that** the method further comprises the phase: an assumption is made about the destination floor of a passenger if the call is given with up/down call pushbuttons.