CLAIMS

1.- A method (90) for locally correcting a routing path in an ad hoc network (1) including a plurality of nodes, each node including transceiver means able to receive and transmit data messages, the nodes communicating with each other by sending signals corresponding to said data messages in time slots (S1, S2, S3, S4) organized in frames, the frames being synchronized through the ad hoc network, a routing of the data messages being achieved through the ad hoc network on the basis of a routing table defining a routing path for the communication between each pair of nodes of the network,

characterizing that said method is applied in a group of nodes of the ad hoc network including a source node (10), at least first and second relay nodes (11, 12), and an addressee node (13), the first and second relay nodes being neighbors of the source node, the addressee node neighboring the first and second relay nodes but not neighboring the source node, the source node having useful data to be retransmitted towards a final addressee (15) and the routing table indicating that the corresponding routing path passes through the first relay node (11), and then through the addressee node (13),

and in that said method includes the steps of:

- computing (250), by the source node (10), of a quantity characteristic of an elementary path between the source node (10) and the addressee node (13), via the first relay node (11) and a characteristic quantity of an elementary path between the source node (10) and the addressee node (13), via the second relay node (11);
- verifying (270), by the source node (10), of the observance of a predetermined criterion for said characteristic quantity of the elementary path between the source node and the addressee node, via the first relay node;
- in the case of positive verification, using the routing path indicated in the routing table, namely using the first relay node (11) for relaying the useful data from the source node (10) to the addressee node (13); and
- in the case of negative verification, using the second relay node (12) for relaying the useful data from the source node (10) to the addressee node (13).

2.- The method according to claim 1, wherein, during a signaling slot (S1) of each frame, each node has the possibility of transmitting a signaling message including signaling information, the pieces of signaling information allowing each node to determine its neighboring nodes of rank one, a connection quality with each of its neighboring nodes of rank one, its neighboring nodes of rank two, and a connection quality between a

neighboring node of rank one and a neighboring node of rank two, the connection qualities giving the possibility, in the computing step (250), to a source node (10) of determining a communication quality.

3.- The method according to claim 1 or claim 2, wherein the step for using the second relay node (12) consists of relaying the useful data towards the addressee node (13) both via the elementary path between the source node (10) and the addressee node (13), via the first relay node (11), and via the elementary path between the source node (10) and the addressee node (13), via the second relay node (12).

4.- The method according to claim 3, wherein the step for using the second relay node (12) applies an operating mode in the formation of a bundle, wherein first and second relay communication messages, transmitted by the first and second relay nodes respectively, interfere constructively at the addressee node (13), at least in their respective useful payload portions including the useful data to be retransmitted, the first and second relay communication messages being transmitted during a dedicated relay communication slot (S3) of the frame.

5.- The method according to claim 4, wherein the addressee node (13):

- measures a phase (φ) of a signal transmitted by a relay node (11, 12) from a pattern, characteristic of the transmitting relay node, provided in a header portion of the relay communication message;
- selects one of the relay nodes as master relay nodes;
- computes for each of the other relay nodes, so called slave nodes, a phase shift ($\Delta\varphi$) resulting from the difference between the phase measured for the relevant slave relay node and the phase measured for the master relay node; and,
- transmits the computed phase shift to the corresponding slave relay node in an adjustment message transmitted in a dedicated adjustment slot (S4) of the frame,

and wherein a relay node (12) having received an adjustment message adjusts a phase of its transceiver means so as to cancel out the phase shift indicated in said adjustment message.

6.- The method according to claim 5, wherein each relay node (12) is able to compute a frequency drift of its transceiver means from the phase shift contained in a succession of adjustment messages transmitted by a same addressee node (13) and of adjusting the frequency of its transceiver means so as to correct said frequency drift, at least during the

relay communication slot (S3) for transmitting a relay communication message to said addressee node.

7.- The method according to claim 1 or claim 2, wherein, the characteristic quantity being a communication quantity along an elementary path, the predetermined criterion consist of verifying that the characteristic quantity of the elementary path between the source node (10) and the addressee node (13), via the first relay node (11), which is the relay node indicated by the routing table, is smaller than the characteristic quantity of the elementary path between the source node (10) and the addressee node (13), via the second relay node (12), the step for using the second relay node consisting of relaying the useful data towards the addressee node (13) exclusively through the second relay node (12), as a substitution for the first relay node (11).

8.- An ad hoc network (1) including a plurality of nodes able to receive and transmit data messages and communicating with each other by sending signals in time slots organized in frames, characterizing that each node includes means for applying the method (90) according to one of the preceding claims.

9.- The network according to claim 8, wherein the frames include:

- a signaling slot (S1), allowing each node to transmit a signaling signal including signaling information, the pieces of signaling information allowing each node to determine its neighboring nodes of rank one, a connection quality with each of its neighboring nodes of rank one, its neighboring nodes of rank two, and a connection quality between each node of rank one and each node of rank two;
- a source communication slot (S2), allowing a node operating as a source node of transmitting a source communication message to a node of rank one operating as a relay node, the source communication message including useful data to be transmitted to a final addressee;
- a relay communication slot (S3), allowing a node operating as a relay node of transmitting a relay communication message towards an addressee node, the relay communication message including a header portion integrating a pattern, characteristic of the transmitting relay node, allowing the addressee node of computing a phase of the signal corresponding to the relay communication message, and a useful payload portion including useful data to be relayed towards the addressee node; and,

- an adjustment slot (S4), allowing a node operating as an addressee node of transmitting an adjustment message to a relay node from a set of relay nodes used in a mode for forming a bundle, the adjustment message including a phase shift.

10.- The network according to claim 8 or claim 9, wherein each addressee node (13) of a plurality of relay communication messages transmitted by relay nodes (11, 12) of a set of relay nodes used in a mode for forming a bundle, is able to compute a phase (φ) for each of said relay nodes from the signal corresponding to the incident relay communication message, to determine a phase shift between at least two of said relay nodes and to transmit the computed phase shift to one of said at least two relay nodes, in an adjustment message transmitted in a dedicated adjustment slot (S4) of the frame.

11.- The network according to claim 10, wherein each node operating as a relay node is able to estimate a frequency shift of its transceiver means from the phase shift contained in a succession of adjustment messages transmitted by a same addressee node (13) and of adjusting its transceiver means for correcting said drift.

12.- The network according to any of claims 8 to 11, wherein the routing table of a node includes, for each addressee (15) of useful data, the neighboring node of rank one of the relevant node and the neighboring node of rank two of the relevant node along the routing path.