CLAIMS

1. A sensory perception surgical system for robot-assisted laparoscopic surgery, comprises:

an electrosurgical forceps (104) coupled to a surgical tool (102);

an electrocautery radiofrequency signal generator (300) electrically coupled to an impedance measurement circuit (301) and operable for supplying energy to the electrosurgical forceps (104);

the impedance measurement circuit (301) including:

a measurement sensor (310) configured to measure a signal indicative of a magnitude corresponding to the value of a contact impedance between the electrosurgical forceps (104) and a patient's tissue;

an oscillator (309) configured to provide a power signal to the measurement sensor (310);

a first electrical circuit comprising one or more resistors (307) and a voltage limiter (308) to protect the measurement sensor (310) and the oscillator (309), the measurement sensor (310) and the oscillator (309) are connected to the electrosurgical forceps (104) by a power cable (304) of the surgical tool (102);

a second electronic circuit comprising a first switch circuit (305) for commutating between the connection and the disconnection of a power cabling (314) of the electrocautery radiofrequency signal generator (300) with respect to the power cable (304) of the surgical tool (102), and a second switch circuit (306) for commutating between the connection and the disconnection of the electrocautery radiofrequency signal generator (300) and the measurement sensor (310); and

a radiofrequency detector (313) including at least one capacitive or inductive sensor (312) arranged on said power cabling (314) for automatically commutating the first and second switch circuits (305, 306) while supplying energy; and

a processor (311) operatively connected to the impedance measurement circuit (301) to receive said signal measured by the measurement sensor (310) and to convert same into a force vector, the latter being estimated as a reflected vector of the received signal, the modulus of said vector being a function of the contact impedance and the

argument of the vector being defined by a trajectory followed by the surgical tool (102) in the moment of contact.

2. The system according to claim 1, wherein the electrocautery radiofrequency signal generator (300) is configured for supplying said energy as both monopolar and bipolar energy.

3. The system according to claim 1, wherein the supplied energy is monopolar and wherein the first switch circuit (305) and the second switch circuit (306) each includes a relay (A1, B1).

4. The system according to claim 1, wherein the supplied energy is bipolar and wherein the first switch circuit (305) and the second switch circuit (306) each includes at least two relays (A1, A2, B1, B2).

5. The system according to claim 1, further comprising a control unit (110) including control elements (111, 113) operatively connected to the impedance measurement circuit (301) and the electrocautery radiofrequency signal generator (300) for the control thereof.

6. The system according to claim 5, wherein the control elements comprise pedals (113) and/or actuators/push buttons (111).

7. The system according to claim 5 or 6, wherein the processor (311) is included in the control unit (110).

8. The system according to claim 1, wherein the electrosurgical forceps (104) are coupled to the surgical tool (102) using a set of pulleys (210, 211, 212, 213, 220, 221, 222, 223, 230, 231) and cables (C1a, C1b, C2, C3, C4 and C5) which allow the opening or closing of the electrosurgical forceps (104) and the mobility thereof, wherein at least one of the pulleys (210, 211, 212, 213, 220, 221, 222, 223, 230, 231) is arranged on the articulation shaft thereof.

9. The system according to claim 8, wherein the set of pulleys (210, 211, 212, 213, 220, 221, 222, 223, 230, 231) are arranged on three parallel shafts (203, 204, 205) arranged in a diametrical position with respect to the surgical tool (102) and to a body (202) of the electrosurgical forceps (104).

10. A non-transitory computer readable medium comprising program code instructions, the code instructions, when executed by a processing unit of a sensory perception surgical system that comprises an electrosurgical forceps (104) coupled to a surgical tool (102), an impedance measurement circuit (301) and an electrocautery radiofrequency signal generator (300) electrically coupled to an impedance measurement circuit (301) and operable for supplying energy to the electrosurgical forceps (104), the impedance measurement circuit (301) including a measurement sensor (310), an oscillator (309), a first electrical circuit comprising one or more resistors (307) and a voltage limiter (308), a second electronic circuit comprising a first switch circuit (305) and a second switch circuit (306), and a radiofrequency detector (313) including at least one capacitive or inductive sensor (312), implementing a method for estimating a reaction force vector perceived in a control unit of the sensory perception surgical system by means of:

receiving a signal indicative of a magnitude corresponding to the value of a contact impedance between the electrosurgical forceps (104) and a patient's tissue, measured by the measurement sensor (310);

converting the received signal into a force vector, the latter being estimated as a reflected vector of the received signal, the modulus of said vector being a function of the contact impedance and the argument of the vector being defined by a trajectory followed by the surgical tool (102) in the moment of contact.