★★★ ＜第36回知的財産翻訳検定試験【第19回和文英訳】＞ ★★★
≪１級課題 -電気・電子工学-≫

【問 1】

In recent years, the development of additive 3D printers has been progressing both domestically and internationally in the field of construction, as a building method for depositing a material layer-by-layer to form a laminated object (structure), using 3D printing technology. The material for use in the additive 3D printers is basically a cementitious material, and mortar kneaded by a mixer is pumped and fed to a three-dimensional modeling apparatus. Work using such an additive 3D printer is capable of structure formation by additive manufacturing without the need for formwork, and is therefore expected to be much superior to conventional concrete work in terms of labor savings, design flexibility, safety, and the like.

[0003]

To put such a working approach into practical use in the future, it is necessary to consider not only the development, improvement, etc. of 3D printers, but also the pumpability of a material, the self-supporting performance of the material immediately after being extruded through a nozzle in forming a laminated object (structure), the surface properties of the laminated object after curing, and the like.

[0004]

Forming a laminated object (structure) with high working accuracy mainly requires the development of materials with improved self-supporting performance and the development of machines, in terms of, for example, the positional accuracy, speed, and material extrusion rate of a nozzle. It also requires structural performance for allowing the resultant structure (structural form) to exhibit adequate strength against various external forces.

【問 2】

[0037]

The high-frequency inverter 12 of the power transmitter 1 and the high-frequency rectifier circuit 22 of the power receiver 2 each include four

reverse-conducting power semiconductor switches (Q_1 to Q_4), such as MOSFETs or IGBTs, which constitute the full bridge circuit. Specifically, as an example, the high-frequency inverter 12 of the power transmitter 1 includes a pair of inverter legs. One of the inverter legs includes the high-side switching element (Q_1) and the low-side switching element (Q_2) that are connected in series, and antiparallel diodes that are connected in parallel with the switching elements in one-to-one correspondence. The other inverter leg includes the high-side switching element (Q_3) and the low-side switching element (Q_4) that are connected in series, and antiparallel diodes that are connected in parallel with the switching elements in one-to-one correspondence. The high-frequency inverter 12 of the power transmitter 1 adopts phase shift and pulse width modulation that enables adjustment of the high-frequency output, only by phase control on the driving timing of the switching elements (Q_1 to Q_4).

[0038]

In the power receiver 2, the voltage smoothing capacitor 24 connected in parallel with the battery 21 smooths signals by reducing ripples caused after the rectification by the high-frequency rectifier circuit 22, so as to bring the signals closer to direct current.

[0039]

The power transmitting-side resonance circuit 13 includes a reactor (L_1) and a variable capacitor (C_1). The power receiving-side resonance circuit 23 includes a reactor (L_2) and a variable capacitor (C_2). An ultrasonic transducer including a piezoelectric element, such as a BLT, serves as a capacitor-type load (C-type load); therefore, each resonance circuit may be practicable using a combination of the ultrasonic transducer with only a reactor.

[0040]

As described above, each of the BLTs applies, in advance, compressive stress with the bolt, and therefore enables considerably large stress amplitude. Each of the BLTs can thus be used as a powerful ultrasonic transducer. In addition, the BLTs exhibit high mechanical strength and high electro-acoustic conversion efficiency. The BLTs are therefore suitable for undersea contactless ultrasonic power transmission. The BLTs have a specific mechanical resonance frequency and enable considerably large stress amplitude in such a manner that the BLTs are

driven at the resonance frequency or a frequency around the resonance frequency.

翻訳者コメント
【００３７】
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【問 3】
1. A position estimation system for estimating a position of a radio wave receiving device in a predetermined space, based on a received signal strength when the radio wave receiving device receives, in the space, radio waves transmitted from three or more radio wave transmitting devices,

the position estimation system comprising:

acquisition means for acquiring information about the received signal strength upon reception of the radio waves from the three or more radio wave transmitting devices;

generation means for generating, based on the information corresponding to at least three radio wave transmitting devices among the three or more radio wave transmitting devices, a first vector including as an element a distance between each of the at least three radio wave transmitting devices and the radio wave receiving device; and

estimation means for estimating a position of the radio wave receiving device, based on a similarity between the first vector and a second vector corresponding to a predetermined position in the space, the second vector including as an element a distance between each of the at least three radio wave transmitting devices and the predetermined position.

2. The position estimation system according to claim 1, wherein

the second vector is generated for each of a plurality of positions on a predetermined planar area in the space, and

the estimation means estimates the position of the radio wave receiving device, based on a similarity between the first vector and the second vector corresponding to each of the plurality of positions.

3. The position estimation system according to claim 1 or 2, wherein

the second vector is generated for each of a plurality of sets of different combinations of at least three radio wave transmitting devices among the three or more radio wave transmitting devices,

the generation means generates the first vector for each of the plurality of sets, and

the estimation means estimates the position of the radio wave receiving device, based on a similarity between the first vector and the second vector for each of the plurality of sets.