CLAIMS

1. A mobile dynamic body weight support device, comprising:

a frame, the frame including:

a transverse bar;

two support arms, the two support arms being coupled to the transverse bar, the two support arms extending parallel to one another; and,

an assembly corresponding to each of the two support arms, the assembly including:

a drive wheel, the drive wheel being coupled to a base of the frame;

a hinge, the hinge including a first support plate and a second support plate, the first support plate being coupled to the respective one of the two support arms to form a cantilevered hinge;

a rope; and

a pulley system, the pulley system comprises:

a first set of pulleys, the first set of pulley being coupled to the transverse bar;

a second set of pulleys, the second set of pulleys being coupled with the second support plate; and

a third set of pulleys, the third set of pulleys being coupled with the second support plate, wherein the rope passes sequentially through the first set of pulleys, the second set of pulleys, and the third set of pulleys, and wherein an end of the rope extends beyond the third set of pulleys, a direction of the rope being changed by the second set of pulleys,

a second angle encoder, the second angle encoder being coupled to the second support plate, wherein the second angle encoder is disposed adjacent to the third set of pulleys to sense a second offset angle of the rope and generate a second signal,

wherein the drive wheel is responsive to the second signal generated by the second angle encoder to follow a user's movement.

2. The mobile dynamic body weight support device as recited in claim 1, wherein the assembly further comprises:

a first angle encoder, the first angle encoder being coupled to the second support plate, wherein the first angle encoder is disposed adjacent to the second set of pulleys to sense a first offset angle of the rope, and wherein the first angle encoder is configured to generate a first signal to the drive wheel responsive to the first offset angle.

3. The mobile dynamic body weight support device as recited in claim 2, wherein the first angle encoder is configured to calculate an angular offset between two ropes corresponding to the two support arms, and wherein the first angle encoder is configured to send the first signal to the drive wheel in response to the angular offset.

4. The mobile dynamic body weight support device as recited in claim 2 or 3, wherein a differential movement between two of the drive wheel is dependent on the first signal, each of the drive wheel corresponding to a respective one of the two support arms.

5. The mobile dynamic body weight support device as recited in claim 2, wherein an actuation of the drive wheel is responsive to a detection of a parallel offset angle of the rope with respect to the frame.

6. The mobile dynamic body weight support device as recited in claim 5, wherein the rope is coupled to a respective shoulder strap of a harness, and wherein the drive wheels are configured to be driven independently of one another to position a user in the harness in a center position relative to the frame.

7. The mobile dynamic body weight support device as recited in claim 1, wherein the assembly further comprises:

a motor, the motor is coupled to the frame, the rope is coupled to a main shaft of the motor, a length of the rope from the second set of pulleys to the end of the rope being determined by a rotation of the main shaft; and

a braking device is coupled to the frame, wherein in a power-off state the braking device is configured to prevent a rotating motion of the main shaft.

8. The mobile dynamic body weight support device as recited in claim 7, wherein the braking device comprises:

a sprocket fixedly coupled with the main shaft, the sprocket having a plurality of teeth, adjacent ones of the plurality of teeth being spaced apart to define a corresponding plurality of gaps between the plurality of teeth; and

a brake pin, the brake pin is coupled with an electromagnet of the braking device, wherein the braking device is configured to lock the main shaft in response to either a power failure or an emergency braking signal, the brake pin being configured to be inserted into one of the plurality of gaps to lock the main shaft.

9. The mobile dynamic body weight support device as recited in claim 1, wherein the wheel further comprises a compression spring, the compression spring being provided with a preload.

10. The mobile dynamic body weight support device as recited in claim 2, further comprising a harness, the harness comprises two shoulder straps, each of the two shoulder straps may be coupled with the end of the corresponding rope.

11. The mobile dynamic body weight support device as recited in claim 2, in operation, the drive wheel is configured to displace the frame to align the frame with a position of a user, in response to the first signal and/or the second signal.