connected via the wrist joint connection HGV_2. Each of the wrist joint connections HGV_1, HGV_2, HGV_3 enables a movement about a wrist axis of rotation $HR_{GV,1}$, $HR_{GV,2}$, $HR_{GV,3}$ assigned to the same, and thus a three-dimensional orientation of the effector E in space.

Fig. 3 shows an illustration of an embodiment of a robot wrist according to the invention, on a robot arm. The illustrated robot wrist comprises three actuator-drivable wrist joint connections HGV_1, HGV_2, and HGV_3 which are connected in series via two wrist links HGL_1 and HGL_2. The proximal wrist link HGL_1 of the robot wrist is connected to a robot arm via the wrist joint connection HGV_1. The distal wrist link HGL_2 of the robot wrist can be connected via the wrist joint connection HGV_3 to an effector E (not shown). The wrist links HGL_2 and HGL_1 are connected via the wrist joint connection HGV_2. Each of the wrist joint connections HGV_1, HGV_2, HGV_3 enables a movement about a wrist axis of rotation $HR_{HGV,1}$, $HR_{HGV,2}$, $HR_{HGV,3}$ assigned to the same, and thus a three-dimensional orientation of the effector E in space.

The robot wrist is designed in such a manner that the wrist axes of rotation $HR_{HGV,1}$ and $HR_{HGV,2}$ intersect at an angle in the range of 90°, and the wrist axis of rotation $HR_{HGV,3}$ has, for any arbitrary configuration of the robot hand joint, a radially constant spacing D1 from the wrist axis of rotation $HR_{HGV,2}$. In addition, a sensor for detecting a force or a torque about the respective wrist axis of rotation $HR_{HGV,1}$, $HR_{HGV,2}$, $HR_{HGV,3}$ is present in all of the wrist joint connections HGV_1, HGV_2, and HGV_3.

CLAIMS

1. A robot arm, having a number N of actuator-drivable joint connections GV_n, which are connected in series via arm links GL_i, where n = 1, 2, ..., N, and i = 1, 2, ..., N-1, and N ≥ 6, wherein

- a proximal arm link GL_1 of the robot arm can be connected to a robot body RK via the joint connection GV_1,
- a distal arm link GL_{N-1} of the robot arm can be connected to an effector E via the joint connection GV_N,
- the arm links GL_{N-1} and GL_{N-2} are connected via the joint connection GV_{N-1},

and the arm links GL_{N-2} and GL_{N-3} are connected via the joint connection GV_{N-2}, and

- each of the joint connections GV_N, GV_{N-1}, GV_{N-2} enables a movement about an axis of rotation $R_{GV,N}$, $R_{GV,N-1}$, $R_{GV,N-2}$ assigned to the same,

characterized in that the robot arm is designed in such a manner that

- the axes of rotation $R_{GV,N-2}$ and $R_{GV,N-1}$ intersect at an angle in the range from 50 to 130°,
- the axis of rotation $R_{GV,N}$ is arranged radially at a constant spacing D1 from the axis of rotation $R_{GV,N-1}$, and
- the joint connection GV_{N-1} is adapted for detecting a force or torque about the axis of rotation $R_{GV,N-1}$; and

characterised in that the constant spacing D1 is selected to be in the range from 1 to 50 cm.

2. The robot arm according to claim 1, **characterized in that** the robot arm is designed in such a manner that a projection of the axis of rotation $R_{GV,N}$ onto a plane spanned by the axes of rotation $R_{GV,N-2}$ and $R_{GV,N-1}$ forms an angle in the range from 50 to 130° with the axis of rotation $R_{GV,N-1}$.

3. The robot arm according to claim 2, **characterized in that** the axes of rotation $R_{GV,N-2}$ and $R_{GV,N-1}$ form an angle of 90°, and/or the projection of the axis of rotation $R_{GV,N}$ onto the plane spanned by the axes of rotation $R_{GV,N-2}$ and $R_{GV,N-1}$ forms an angle of 90° with the axis of rotation $R_{GV,N-1}$.

4. The robot arm according to any one of the claims 1 to 3,
characterized in that the joint connection GV_N is adapted for detecting a force or a torque about the axis of rotation $R_{GV,N}$, and/or the joint connection GV_{N-2} is adapted for detecting a force or a torque about the axis of rotation $R_{GV,N-2}$.

5. The robot arm according to any one of the claims 1 to 4,
characterized in that the robot arm is designed in such a manner that
- the axes of rotation R_{GV1} and R_{GV2} intersect at an angle in the range from 50 to 130°,
- the axes of rotation R_{GV2} and R_{GV3} intersect at an angle in the range from 50 to 130°,
- the axis of rotation R_{GV4} is arranged radially at the constant spacing D1 from the axis of rotation R_{GV3}, and
- the axes of rotation R_{GV4} and R_{GV5} intersect at an angle in the range from 50 to 130°.

6. The robot arm according to any one of the claims 1 to 4,
characterized in that the robot arm is designed in such a manner that
- the axes of rotation R_{GV1} and R_{GV2} intersect at an angle in the range from 50 to 130°,
- the axes of rotation R_{GV2} and R_{GV3} intersect at an angle in the range from 50 to 130°,
- the axes of rotation R_{GV3} and R_{GV4} intersect at an angle in the range from 50 to 130°,
- the axis of rotation R_{GV5} is arranged radially at the constant spacing D1 from the axis of rotation R_{GV4}.

7. The robot arm according to any one of the claims 1 to 4,
characterized in that the robot arm is designed in such a manner that
- the axes of rotation R_{GV1} and R_{GV2} intersect at an angle in the range from 50 to 130°,
- the axes of rotation R_{GV2} and R_{GV3} intersect at an angle in the range from 50

to 130°,

- the axis of rotation R_{GV4} is arranged radially at the constant spacing D1 from the axis of rotation R_{GV3}, and

- the axis of rotation R_{GV5} is arranged radially at the constant spacing D1 from the axis of rotation R_{GV4}.

8. A robot wrist, having three actuator-drivable wrist joint connections HGV_n, which are connected in series via two wrist links HGL_i, where n = 1, 2, or 3 and i = 1 or 2, wherein

- a proximal wrist link HGL_1 of the robot wrist can be connected to a robot arm via the wrist joint connection HGV_1,
- a distal wrist link HGL_2 of the robot wrist can be connected to an effector E via the wrist joint connection HGV_3,
- the wrist links HGL_2 and HGL_1 are connected via the wrist joint connection HGV_2, and
- each of the wrist joint connections HGV_1, HGV_2, HGV_3 enables a movement about a wrist axis of rotation $HR_{HGV,1}$, $HR_{HGV,2}$, $HR_{HGV,3}$ assigned to the same, **characterized in that** the robot wrist is designed in such a manner that
- the wrist axes of rotation $HR_{HGV,1}$ and $HR_{HGV,2}$ intersect at an angle in the range from 50 to 130°,
- the wrist axis of rotation $HR_{HGV,3}$ is arranged radially at a constant spacing D1 from the wrist axis of rotation $HR_{HGV,2,}$ and
- the wrist joint connection HGV_2 is designed for detecting a force or a torque about the wrist axis of rotation $HR_{HGV,2}$.

9. The robot wrist according to claim 8,
characterized in that the robot wrist is designed in such a manner that a projection of the wrist axis of rotation $HR_{HGV,3}$ onto a plane spanned by the wrist axes of rotation $HR_{HGV,1}$ and $HR_{HGV,2}$ forms an angle in the range from 50 to 130° with the wrist axis of rotation $HR_{HGV,2}$.

10. Robot wrist according to claim 9,
characterized in that the wrist axes of rotation $HR_{HGV,1}$ and $HR_{HGV,2}$ form an angle of 90°, and/or the projection of the wrist axis of rotation $HR_{HGV,3}$ onto the

plane spanned by the wrist axes of rotation $HR_{HGV,1}$ and $HR_{HGV,2}$ forms an angle of 90° with the wrist axis of rotation $HR_{HGV,2}$.

11. Robot wrist according to any one of the claims 8 to 10,
characterized in that the wrist joint connection HGV_3 is designed for detecting a force or a torque about the wrist axis of rotation $HR_{HGV,3}$, and/or the wrist joint connection HGV_1 is designed for detecting a force or a torque about the wrist axis of rotation $HR_{HGV,1}$.

12. A robot, having a robot arm according to any one of the claims 1 to 7, or a robot wrist according to any one of the claims 8 to 11.