3.1 Introduction

Design of two and multi-legged robots like four legged, six legged, and eight legged robots shows a practical usefulness of Bionics for the domain of robotics. Depending on the number of legs, such robotic platforms can be inspired from body constitution, walking mechanics, and behavior of humans, animals (four legged), insects (six legged), or spiders (eight legged). There is also another kind of robotic designs depicted as hybrid robots, which have a mixture of concepts seen in nature and artificial designs. These robots can be often found having tracks, other special leg designs, wheeled-legged robot designs and the like.

In this chapter several joint leg walking and hybrid robots are discussed. The “joint leg” term is related to robots that have legs built out of servos, representing their joints. The term “hybrid” found by hybrid robots is related to robots that have both legs built out of servo joints and wheels attached to their legs.

Robots demonstrators presented in this chapter have been used as demonstrators for biologically inspired approaches and algorithms researched and elaborated in this book. These robots can be categorized into three types: humanoid robots, hexapod-robots, and hybrid wheeled-legged robots.

3.2 Hexapod Robots

Hexapod robots belong to the group of joint leg walking robots having six legs where the legs are consisting of multiple servo joints. The legs of the robot are usually symmetrically distributed in two different groups spatially located on the two opposite sides of the robot's body. The design of hexapod robots is often inspired by locomotion systems seen in insects like cockroaches, stick insects, and the like.

In comparison with the four legged walking robots or quadruped robots, hexapod robots have intrinsically more redundancy due to the higher number of the legs and thus can be theoretically more flexible over uneven terrain. Hexapod
robots differ from robots that have “native” spider-like biomimetic design having eight legs distributed on the two sides of the robot’s body. Although the eight legged robots may have higher degree of redundancy and perhaps provide better agility for the robot over rugged terrain, they also need more energy for their functioning, which in turn affects the size and mobility of the robot.

Fig. 3.1 Hexapod robots: (a) “iSprawl”; (b) “RHex”; (c) “DLR Crawler”; (d) “RiSE”; (e) “AMOS-WD06”.