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**Abstract**

The intention of this article is to introduce and overview Pneumatic Artificial Muscles (PAMs) as whole and to discuss on its numerical modelling, namely using the Finite Element (FE) Method, to understand more on its behaviour in generating force for actuation. The construction of PAMS mainly consist of flexible, inflatable membranes, having orthotropic material behaviour. The main properties shaping the PAMs will be explained in terms of their load-carrying capacity and low weight in assembly. Discussion on their designs and capacity to function as locomotion device in robotics applications will be laid out, followed by FE modelling to represent PAMs overall structural behaviour under any potential operational conditions.

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