

Optimization of Deadweights Caused by the Design of Industrial Robot Arms

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Abstract – In industrial robots, projected torque is increasing depending on the extending reach length and payload. This requires selection of powerful engines particularly on the second axis. Since arm's rigidity becomes more important as the expected positioning precision increases, less flexible materials are used. Therefore, during operation conditions, 70% of engine's energy used for inert payloads. In this study, analyses conducted on five different robotic arms belong to different brands. Arm's payload distribution in terms of region and quantity is inspected, alternative designs are analyzed and compared with each other. Geometry and materials are changed in alternative designs. In this way, inert payloads are minimized (without increasing the allocation quantity) at the same positioning precision. Results of this study demonstrated a 13 % decrease in inert payloads.

Keywords – Robot arm optimization, Robot arm, Industrial robot, Finite elements methods, Design