Appendix A. Mathematical model of engineering model

A.1 Speed Reducer(P1)

Consider:

Minimize:

Subject to:

Variable range:

A.2 Multiple disk clutch brake design problems(P2)

Consider:

Minimize:

Subject to:

Variable range:

A.3 Piston lever(P3)

Consider:

Minimize:

Subject to:

Where

Variable range:

A.4 Car side impact design(P4)

Consider:

Minimize:

Subject to:

Variable range:

A.5 Cantilever beam(P5)

Consider:

Minimize:

Subject to:

Variable range:

A.6 Minimize I-beam vertical deflection(P6)

Consider:

Minimize:

Subject to:

Variable range:

A.7 Tubular column design(P7)

Consider:

Minimize:

Subject to:

Variable range:

A.8 Design of welded beam design(P8)

Consider:

Minimize:

Subject to:

Variable range:

A.9 Reinforced concrete beam design(P9)

Consider:

Minimize:

Subject to:

Variable range: