ME 491 – Design Process – Parametric Study

Parametric product analysis is a type of benchmarking and helps determine what targets are reasonable given the state of technology. In parametric analysis any criterion can be plotted against any other that makes sense. Unit-less ratios may be particularly useful. **The following shows a couple of plots for the performance and price of electric vehicles.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| An Example of PARAMETRIC ANALYSIS of market products | | | | | | | |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Model | Cost | Miles | Max Speed | Weight | Capacity | Charge time | (Miles)\*(mph) |
|  | US dollar |  | mph | lbs | lbs | hrs |  |
| Tesla S | 60000 | 225 | 80 |  |  |  | 0.65 |
| XS500 by Miles | 35000 | 120 | 80 |  |  |  | 0.35 |
| Zenn | 15000 | 40 | 25 |  |  | 7 | 0.04 |
| ThinkCity | 25000 | 110 | 65 |  |  |  | 0.26 |
| Whitney | 11000 | 80 | 45 |  |  |  | 0.13 |
| Alias | 32500 | 100 | 100 | 1600 |  |  | 0.36 |
| Zebra | 11700 | 25 | 40 | 2800 | 500 | 6 | 0.04 |
| Tesla Roadstar | 109000 | 220 | 125 |  |  | 3.5 | 1.00 |
| GEM | 10000 | 35 | 25 |  |  | 7 | 0.03 |
| Dynesty | 20000 | 30 | 25 |  |  | 6 | 0.03 |
| Honda EV plus | 54000 | 125 | 86 |  |  | 7 | 0.39 |
|  |  |  |  |  |  |  |  |

**Parametric Analysis of NiMH batteries for hobby applications**

|  |  |  |  |
| --- | --- | --- | --- |
| NiMH Battery Capacity and Price | | | |
| Brand | Capacity | Cost | Cost/Capacity |
|  | Amp-hr | Dollars | Dollar/Ahr |
|  | 4.2 | 43 | 10.24 |
|  | 2 | 25 | 12.50 |
|  | 2 | 20 | 10.00 |
|  | 3.6 | 27 | 7.50 |
|  | 5 | 60 | 12.00 |
|  | 4.2 | 50 | 11.90 |
|  | 3 | 30 | 10.00 |
|  | 5 | 90 | 18.00 |
|  | 2 | 20 | 10.00 |
|  | 1.4 | 20 | 14.29 |
|  | 1.1 | 22 | 20.00 |
|  | 1.6 | 30 | 18.75 |
|  | 1.7 | 14 | 8.24 |
|  | 1.1 | 13 | 11.82 |