

## 530.215 MECHANICS-BASED DESIGN

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### Homework V

Due March 13, 2009

1. A guide pin is required to align the assembly of a two-part fixture. The nominal size of the pin is 15 mm. Make the dimensional decisions for a 15-mm basic size locational clearance fit .
2. An interference fit of a cast-iron hub of a gear on a steel shaft is required. Make the dimensional decisions for a 45-mm basic size medium drive fit.
3. Juvinall, Problem 5.13
4. Juvinall, Problem 5.14

#### Design Problem 1:

Consider the following law enforcement problem. Individuals under the influence of certain drugs become violent for no apparent reason, and must be restrained while being questioned or while being medically examined (a similar problem arises with some mental illnesses). Come up with a design (including a sketch) for a restraining device. *Identify the market for the product first*, and then identify clearly the critical engineering issues, critical cost issues, and critical ethical and legal issues.

- You do not have to provide a full stress analysis at this stage, but you must provide some dimensions which you can justify in an approximate way. You must also state what materials you will use for your product.