

## Section 4.5. Equivalent Systems

**Definition.** A *system of forces and moments* is a set of forces and a set of moments of couples. Two such systems are *equivalent* if the sums of the force sets are equal and if the sums of the moments about a point are equal (notice that moments result both from the forces and from the couples).

**Note.** The conditions for equivalence therefore are:

1.  $\left(\sum \vec{F}\right)_1 = \left(\sum \vec{F}\right)_2$ , and
2.  $\left(\sum \vec{M}_P\right)_1 = \left(\sum \vec{M}_P\right)_2$ .

In fact, point  $P$  is arbitrary and may be chosen conveniently.

**Example.** Page 188 Numbers 4.129 and 4.134.

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