magnetforces

1. Calculating forces between magnets. This is the source to some code to calculate the forces and torques between two cuboid-shaped magnets, subject to a variety of restrictions on displacement and rotation but on the whole providing a reasonably general solution.

⟨ `magnetforces.m` 1 ⟩ ≡

```
[forces torques] = function magnetforces(magnet_fixed, magnet_floating);
  ⟨ extract the input variables 2 ⟩
  ⟨ split the rotations into components 4 ⟩
  ⟨ transform the displacements 3 ⟩
  ⟨ calculate the forces 5 ⟩
  ⟨ recombine the results 6 ⟩
  return;
```

2. First of all, address the data structures required for the input and output. Because displacement and rotation of a single magnet has six components, plus size of each face another three, plus magnetisation strength and direction makes eleven in total, we use one of Matlab's structures to pass the information into the function.

⟨ extract the input variables 2 ⟩ ≡

```
a1 = 0.5*magnet_fixed.dim(1);
b1 = 0.5*magnet_fixed.dim(2);
c1 = 0.5*magnet_fixed.dim(3);
a2 = 0.5*magnet_floating.dim(1);
b2 = 0.5*magnet_floating.dim(2);
c2 = 0.5*magnet_floating.dim(3);
```

This code is used in section 1.

3. Next

⟨ transform the displacements 3 ⟩ ≡

This code is used in section 1.

4. Next

⟨ split the rotations into components 4 ⟩ ≡

This code is used in section 1.

5. Next

⟨ calculate the forces 5 ⟩ ≡

This code is used in section 1.

6. Next

⟨ recombine the results 6 ⟩ ≡

This code is used in section 1.

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