codistributor1d

Create 1-D codistributor object for codistributed arrays

Syntax

```
codist = codistributor1d()
codist = codistributor1d(dim)
codist = codistributor1d(dim,part)
codist = codistributor1d(dim,part,gsize)
```

Description

The 1-D codistributor distributes arrays along a single, specified distribution dimension, in a noncyclic, partitioned manner.

`codist = codistributor1d()` forms a codistributor1d object using default dimension and partition. The default dimension is the last nonsingleton dimension of the codistributed array. The default partition distributes the array along the default dimension as evenly as possible.

`codist = codistributor1d(dim)` forms a 1-D codistributor object for distribution along the specified dimension: `1` distributes along rows, `2` along columns, etc.

`codist = codistributor1d(dim,part)` forms a 1-D codistributor object for distribution according to the partition vector `part`. For example `C1 = codistributor1d(1,[1,2,3,4])` describes the distribution scheme for an array of ten rows to be codistributed by its first dimension (rows), to four workers, with 1 row to the first, 2 rows to the second, etc.

The resulting codistributor of any of the above syntax is incomplete because its global size is not specified. A codistributor constructed in this manner can be used as an argument to other functions as a template codistributor when creating codistributed arrays.

`codist = codistributor1d(dim,part,gsize)` forms a codistributor object with distribution dimension `dim`, distribution partition `part`, and global size of its codistributed arrays `gsize`. The resulting codistributor object is complete and can be used to build a codistributed array from its local parts with `codistributed.build`. To use a default dimension, specify `codistributor1d.unsetDimension` for that argument; the distribution dimension is derived from `gsize` and is set to the last non-singleton dimension. Similarly, to use a default partition, specify `codistributor1d.unsetPartition` for that argument; the partition is then derived from the default for that global size and distribution dimension.

The local part on worker `labidx` of a codistributed array using such a codistributor is of size `gsize` in all dimensions except `dim`, where the size is `part(labidx)`. The local part has the same class and attributes as the overall codistributed array. Conceptually, the overall global array could be reconstructed by concatenating the various local parts along dimension `dim`.

Examples

Use a codistributor1d object to create an `N`-by-`N` matrix of ones, distributed by rows.

```
N = 1000;
spmd
    codistr = codistributor1d(1); % 1st dimension (rows)
    C = ones(N,codistr);
end
```

Use a fully specified codistributor1d object to create a trivial `N`-by-`N` codistributed matrix from its local parts. Then visualize which elements are stored on worker 2.

```
N = 1000;
spmd
    codistr = codistributor1d( ...
                    codistributor1d.unsetDimension, ...
                    codistributor1d.unsetPartition, ...
                    [N,N]);
    myLocalSize = [N,N]; % start with full size on each lab
    % then set myLocalSize to default part of whole array:
    myLocalSize(codistr.Dimension) = codistr.Partition(labindex);
    myLocalPart = labindex*ones(myLocalSize); % arbitrary values
    D = codistributed.build(myLocalPart,codistr);
end
spy(D==2);
```

See Also

codistributed | codistributor2dbc | redistribute