*CONTROL_FORMING_AUTO_NET

Purpose: This keyword facilitates springback simulation of a formed panel on resting nets of a checking fixture. With this keyword, nets are automatically generated according to specified dimensions and positions.

Card Format (I10, X10, 2I10, 3E10.0)

<table>
<thead>
<tr>
<th>Card 1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>IDNET</td>
<td>ITYPE</td>
<td>IDV</td>
<td>IDP</td>
<td>X</td>
<td>Y</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td>none</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Card Format (3E10.0)

<table>
<thead>
<tr>
<th>Card 2</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>SX</td>
<td>SY</td>
<td>OFFSET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cards 3,4,5,6… repeat Card 1 and 2, as many times as needed to define multiple nets. The next “*” card terminates the input.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDNET</td>
<td>ID of the net; must be unique.</td>
</tr>
<tr>
<td>ITYPE</td>
<td>Not used at this time.</td>
</tr>
<tr>
<td>IDV</td>
<td>Vector ID indicating the direction of the net to be generated. See *DEFINE_VECTOR for details. If not defined, the net will be generated along the global Z-axis.</td>
</tr>
<tr>
<td>IDP</td>
<td>Part ID of the panel undergoing springback simulation.</td>
</tr>
</tbody>
</table>
**VARIABLE** | **DESCRIPTION**
---|---
X | X-coordinate of a reference point for the net to be generated.
Y | Y-coordinate of a reference point for the net to be generated.
Z | Z-coordinate of a reference point for the net to be generated.
SX | Length of the net along X-axis.
SY | Length of the net along Y-axis.
OFFSET | The net will be generated at this offset distance away from the reference point.
    | GT.0: the net will be on the global +Z side, or on the vector head side if IDV is defined.
    | LT.0: the net will be on the global –Z side, or on the vector tail side if IDV is defined.

**Remarks:**

1. IDNET is not Part ID of the net to be created. For each X, Y, Z position one net of different part ID will be generated. Part IDs of the generated nets will follow the last part ID in the model and increase in ascending order and is automatically generated. Other properties such as section, material properties and contact interfaces are also established between the panel and nets within the code. Contact type *CONTACT_FORMING_ONE_WAY_SURFACE_TO_SURFACE* is used. Currently, the default type of the net is rectangular in shape.

2. Multiple nets can be generated using one such keyword. In a keyword example shown below, nets ID 1 through 4 are to be generated on the tail side of the vector ID 89, at 4mm away from each respective reference point defined by X, Y and Z coordinates. This example input can be included in a usual springback simulation input deck (without the SPC constraints anywhere) to complete the input file to simulate the panel springback on nets. Gravity load needs to be included.

```
*CONTROL_FORMING_AUTO_NET
$---------------------------1-------------------------------3--------------------------4--------------------------5--------------------------6-------------------------7-------------------------8
$ IDNET ITYPE IDV IDP X Y Z
   1   89      5 2209.82 -33.6332 1782.48
$ SX SY OFFSET
   15.0 15.0 -4.0
$ IDNET ITYPE IDV IDP X Y Z
   2   89      5 3060.23 -33.6335 1782.48
$ SX SY OFFSET
   15.0 15.0 -4.0
$ IDNET ITYPE IDV IDP X Y Z
   3   89      5 3061.21  31.4167 1784.87
$ SX SY OFFSET
   15.0 15.0 -4.0
$ IDNET ITYPE IDV IDP X Y Z
   4   89      5 2208.84  31.4114 1784.87
```
$ SX SY OFFSET
15.0 15.0 -4.0

*DEFINE VECTOR
$ VID, Tail X, Y, Z, Head X, Y, Z
89,0.0,0.0,0.0,0.0,0.0,100.0

3. Two examples are shown in the following figure, where a trimmed blank is gravity loaded in -Z direction and in +Z direction and the corresponding springback shapes are calculated.
3. This feature is now available in Implicit Static in LS-DYNA R5 Revision 62781 or later releases.