Theorem 2

In[1]:= `(* Define mu *)`

```
mu =
  (-8 pf p^3 (-1 + bl) bl (-1 + br) br + 2 p^4 (-1 + bl) bl (-1 + br) br - 2 p (-2 + br + 3 pf br - pf
        br^2 + pf bl^2 (-1 + 4 pf^2 (-1 + br) br) + bl (1 + pf (3 - 4 br) - 4 pf^3 (-1 + br) br)) +
     pf (-br (-2 + pf + pf br) + pf bl^2 (-1 + 2 pf^2 (-1 + br) br) -
        bl (-2 + pf + 4 pf br + 2 pf^3 (-1 + br) br)) + p^2 (-8 + 7 br - br^2 +
        bl^2 (-1 + 12 pf^2 (-1 + br) br) + bl (7 + 4 (-1 + 3 pf^2) br - 12 pf^2 br^2)))) /
   (1 + pf^4 (-1 + bl) bl (-1 + br) br - 4 pf p^3 (-1 + bl) bl (-1 + br) br +
     p^4 (-1 + bl) bl (-1 + br) br - pf^2 (bl + br + 2 bl br) -
     2 pf p (bl + br + 2 (-1 + pf^2) bl br + 2 pf^2 bl^2 (-1 + br) br - 2 pf^2 bl br^2) +
     p^2 (-4 + 3 br + 6 pf^2 bl^2 (-1 + br) br + bl (3 - 2 br + 6 pf^2 br - 6 pf^2 br^2)));
```

`(* Compute mu(B,0) - mu(B/2,B/2) *)`

`compare = Simplify[mu /. {bl → B, br → 0}] - Simplify[mu /. {bl → B / 2, br → B / 2}];`

`(* Specify range of parameters *)`

`conditions = 0 < B < 1 && 0 ≤ p < pf ≤ 1 / 2;`

`(* Verify if it is possible to have mu(B,0) - mu(B/2,B/2) ≤ 0;`

`returns false if the difference > 0 for all parameters within the range *)`

`Reduce[compare ≤ 0 && conditions, {B, pf, p}]`

Out[4]= `False`