Average Completion Time on Multiple Machines

- $P||\sum C_J$ – **SPT is optimal.**
- $P||\sum w_j C_j$ – **Is WSPT optimal?**

Example

j	w_j	p_j
1	**1**	**1**
2	**1**	**1**
3	**100**	**99**

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- $P||\sum w_j C_j$ **is NP-complete.**
- **WSPT is a** $(1+\sqrt{2})/2$ **-approximation for** $P||\sum w_j C_j$

$R||\sum C_j$

- **Can be solved as a matching problem.**
- **Left side node for each job** j
- **Right hand side node for the** k **th from last job on machine** i

Example

	J_1	J_2	J_3	J_4
M_1	**6**	**4**	∞	**3**
M_2	**7**	**5**	**2**	**3**
M_3	**3**	**8**	**5**	**3**

$Q|\text{pmtn}|\sum C_j$

- **Algorithm is SRPT-FM. Shortest Remaining Processing Time on the Fastest Machines.**

- **What about preemption in other models?**
- **P – doesn't help**
- **R – NP-complete**